

TRANSPORTATION IMPROVEMENT PROJECT

INTERSECTION IMPROVEMENTS AT
PETTEE SQUARE
OAK STREET & CHESTNUT STREET

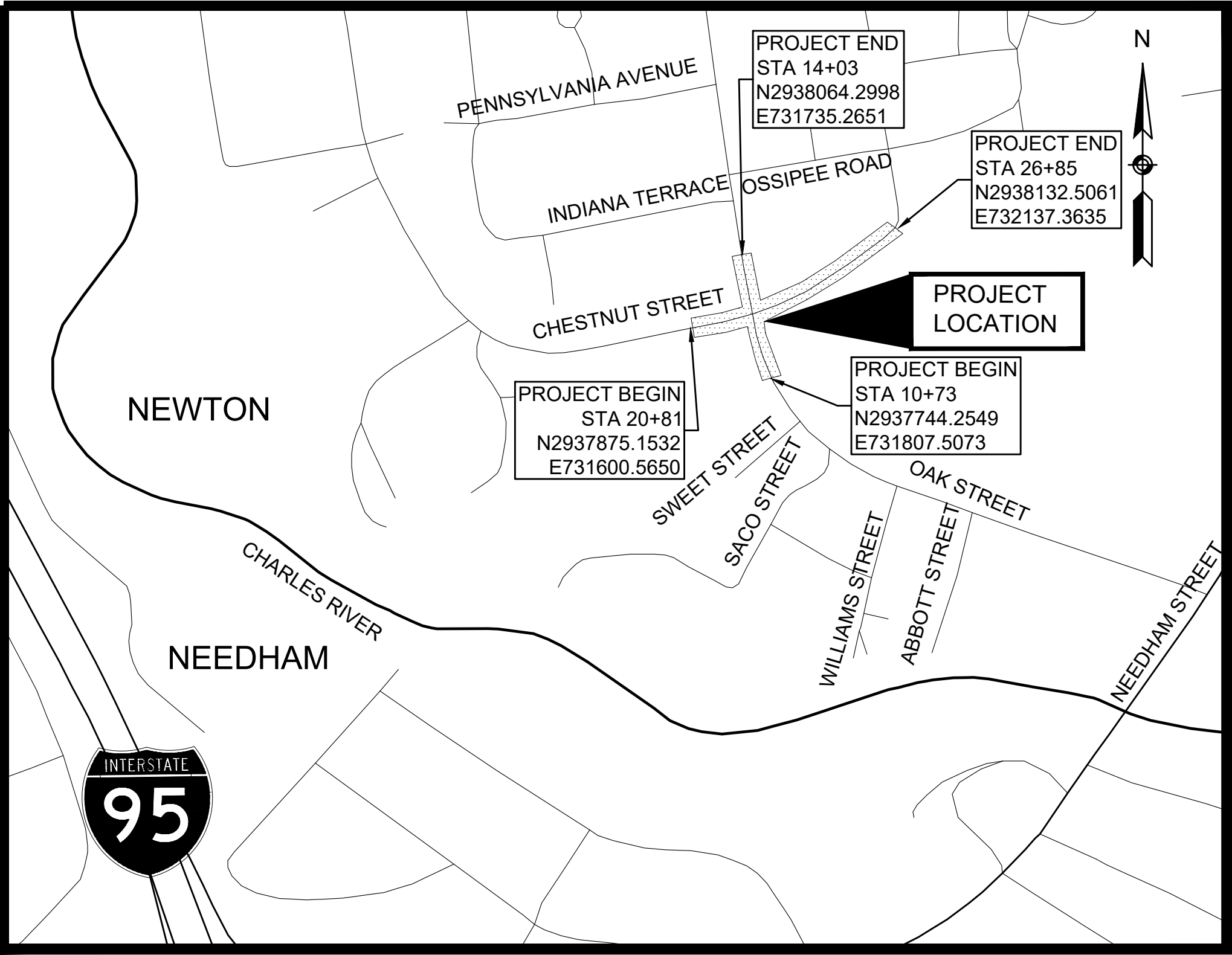
IN THE CITY OF
NEWTON
MIDDLESEX COUNTY
COMMONWEALTH OF MASSACHUSETTS

50% SUBMITTAL

THESE PLANS ARE SUPPLEMENTED BY THE LATEST CITY OF NEWTON GENERAL CONSTRUCTION DETAILS, THE MASSDOT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES DATED 2020, AS AMENDED BY THE SUPPLEMENTAL SPECIFICATION DATED SEPTEMBER 30, 2020, THE OCTOBER 2017 CONSTRUCTION STANDARD DETAILS, THE 2015 OVERHEAD SIGNAL STRUCTURE AND FOUNDATION STANDARD DRAWINGS, MASSDOT TRAFFIC MANAGEMENT PLANS AND DETAIL DRAWINGS, THE 1990 STANDARD DRAWINGS FOR SIGNS AND SUPPORTS, THE 1968 STANDARD DRAWINGS FOR TRAFFIC SIGNALS AND HIGHWAY LIGHTING, AND THE LATEST EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK.

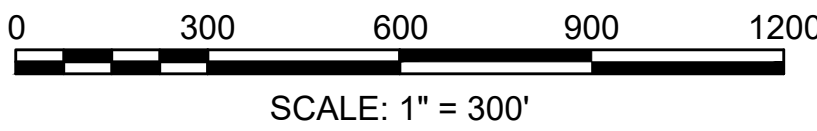
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DESIGN DESIGNATION

OAK STREET	
DESIGN SPEED	30 MPH
ADT (2019)	9,803
ADT (2027)	10,199
K	8.3%
D	52%
T (PEAK HOUR)	1.0%
T (AVERAGE DAY)	2.0%
DHV	815
DDHV	426
FUNCTIONAL CLASSIFICATION	MAJOR COLLECTOR



LENGTH OF PROJECT = 934 FEET = 0.177 MILES

11/18/2020	50% SUBMITTAL	1
DATE	DESCRIPTION	REV #



CITY OF NEWTON
MASSACHUSETTS

DESIGNED BY: RLC
DESIGN DRAFTED BY: RLC
CHECKED BY: LSA
APPROVED BY: LSA

PREPARED BY:



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CITY OF NEWTON
MASSACHUSETTS
TITLE SHEET & INDEX
FOR THE
IMPROVEMENTS
AT
PETTEE SQUARE
OAK STREET AT CHESTNUT STREET

SHEET 1 OF 33



CITY OF NEWTON
MASSACHUSETTS

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APPROVED BY: LSA

GENERAL SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		JERSEY BARRIER
		CATCH BASIN OR GUTTER INLET
		CATCH BASIN OR GUTTER INLET W/ CURB INLET
		FLAG POLE
		GAS PUMP
		MAIL BOX
		POST SQUARE
		POST CIRCULAR
		WELL
		ELECTRIC HANDHOLE
		FENCE GATE POST
		GAS GATE
		BORING HOLE
		MONITORING WELL
		TEST PIT
		HYDRANT
		LIGHT POLE
		COUNTY BOUND
		GPS POINT
		CABLE MANHOLE
		DRAINAGE MANHOLE
		ELECTRIC MANHOLE
		GAS MANHOLE
		MISC MANHOLE
		SEWER MANHOLE
		TELEPHONE MANHOLE
		WATER MANHOLE
		MASSACHUSETTS HIGHWAY BOUND
		MONUMENT
		STONE BOUND
		TOWN OR CITY BOUND
		TROLLEY POLE OR GUY POLE
		TRANSMISSION POLE
		UTILITY POLE W/ FIREBOX
		UTILITY POLE WITH DOUBLE LIGHT
		UTILITY POLE W / 1 LIGHT
		UTILITY POLE
		BUSH
		TREE
		STUMP
		SWAMP / MARSH
		WATER GATE
		WATER SHUTOFF/CURB STOP
		PARKING METER
		OVERHEAD CABLE/WIRE
		CURBING
		CONTOURS (ON-THE-GROUND SURVEY DATA)
		CONTOURS (PHOTOGRAMMETRIC DATA)
		UNDERGROUND DRAIN PIPE (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND ELECTRIC DUCT (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND GAS MAIN (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND SEWER MAIN (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND TELEPHONE DUCT (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND WATER MAIN (DOUBLE LINE 24 INCH AND OVER)
		BALANCED STONE WALL
		GUARD RAIL - STEEL POSTS
		GUARD RAIL - WOOD POSTS
		CHAIN LINK OR METAL FENCE
		WOOD FENCE
		SEDIMENT CONTROL BARRIER
		TREE LINE
		EDGE OF PAVEMENT
		SAWCUT LINE
		TOP OR BOTTOM OF SLOPE
		LIMIT OF EDGE OF MICROMILLING AND OVERLAY
		BANK OF RIVER OR STREAM
		BORDER OF WETLAND
		100 FT WETLAND BUFFER
		200 FT RIVERFRONT BUFFER
		STATE HIGHWAY LAYOUT
		TOWN OR CITY LAYOUT
		COUNTY LAYOUT
		RAILROAD SIDELINE
		TOWN OR CITY BOUNDARY LINE
		PROPERTY LINE OR APPROXIMATE PROPERTY LINE
		EASEMENT

TRAFFIC SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		CONTROLLER CABINET, FOUNDATION
		CONTROLLER CABINET, FOUNDATION, CONC. PAD
		MAST ARM FOUNDATION (SCALE OF BLOCK = DIAMETER IN INCHES)
		MAST ARM (LENGTH NOTED)
		EMERGENCY PREEMPTION CONFIRMATION STROBE LIGHT
		VEHICULAR SIGNAL HEAD
		PEDESTRIAN SIGNAL HEAD
		MAST ARM OR TS POLE MOUNTED SIGN
		EMERGENCY PRE-EMPTION RECEIVER
		EMERGENCY PRE-EMPTION CONFIRMATION STROBE
		PEDESTRIAN PUSH BUTTON
		YAGI ANTENNA
		BICYCLE WIRE LOOP DETECTOR (SIZE AS NOTED)
		WIRE LOOP DETECTOR (SIZE AND TYPE NOTED)
		TRAFFIC SIGN (1 POST)
		TRAFFIC SIGN (2 POST)
		PULL BOX 12"x12" (OR AS NOTED)
		ELECTRIC HANDHOLE 12"x24" (OR AS NOTED)
		TRAFFIC SIGNAL CONDUIT

PAVEMENT MARKING SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		PAVEMENT ARROW - WHITE
		LEGEND "ONLY" - WHITE
		LEGEND "SHARROW" - WHITE
		LEGEND "BICYCLE LANE" - WHITE
		LEGEND "BICYCLE DETECTOR" - WHITE
		STOP LINE - WHITE
		YIELD LINE - WHITE
		CROSSWALK - WHITE (WIDTH NOTED)
		SOLID WHITE LINE (WIDTH NOTED)
		SOLID YELLOW LINE (WIDTH NOTED)
		BROKEN WHITE LINE (WIDTH, LENGTH & SPACING NOTED)
		BROKEN YELLOW LINE (WIDTH, LENGTH & SPACING NOTED)
		DOTTED WHITE LINE (WIDTH, LENGTH & SPACING NOTED)
		DOTTED YELLOW LINE (WIDTH, LENGTH & SPACING NOTED)
		DOTTED WHITE LINE EXTENSION (WIDTH, LENGTH & SPACING NOTED)
		DOTTED YELLOW LINE EXTENSION (WIDTH, LENGTH & SPACING NOTED)
		DOUBLE YELLOW CENTER LINE

ABBREVIATIONS

GENERAL	
AADT	ANNUAL AVERAGE DAILY TRAFFIC
ABAN	ABANDON
ADJ	ADJUST
APPROX.	APPROXIMATE
A.C.	ASPHALT CONCRETE
ACCM PIPE	ASPHALT COATED CORRUGATED METAL PIPE
BIT.	BITUMINOUS
BC	BOTTOM OF CURB
BD.	BOUND
BL	BASELINE
BLDG	BUILDING
BM	BENCHMARK
BO	BY OTHERS
BOS	BOTTOM OF SLOPE
BR.	BRIDGE
CB	CATCH BASIN
CBCI	CATCH BASIN WITH CURB INLET
CC	CEMENT CONCRETE
CCM	CEMENT CONCRETE MASONRY
CEM	CEMENT
CI	CURB INLET
CIP	CAST IRON PIPE
CLF	CHAIN LINK FENCE
CL	CENTERLINE
CMP	CORRUGATED METAL PIPE
CSP	CORRUGATED STEEL PIPE
CO.	COUNTY
CONC	CONCRETE
CONT	CONTINUOUS
CONST	CONSTRUCTION
CR GR	CROWN GRADE
DHV	DESIGN HOURLY VOLUME
DI	DROP INLET
DIA	DIAMETER
DIP	DUCTILE IRON PIPE
DSCB	DEEP SUMP CATCH BASIN
DW	STEADY DON'T WALK - PORTLAND ORANGE
DWY	DRIVEWAY
ELEV (or EL.)	ELEVATION
EMB	EMBANKMENT
EOP	EDGE OF PAVEMENT
EQ	EQUAL
EXIST (or EX)	EXISTING
EXC	EXCAVATION
F&C	FRAME AND COVER
F&G	FRAME AND GRATE
FDN.	FOUNDATION
FLDSTN	FIELDSTONE
GAR	GARAGE
GC	GRANITE CURB
GCC	GRANITE CURB CORNER
GD	GROUND
GG	GAS GATE
GI	GUTTER INLET
GIP	GALVANIZED IRON PIPE
GRAN	GRANITE
GRAV	GRAVEL
GRD	GUARD
HDW	HEADWALL
HMA	HOT MIX ASPHALT
HOR	HORIZONTAL
HYD	HYDRANT
INV	INVERT
JCT	JUNCTION
L	LENGTH OF CURVE
L&S	LOAM & SEED
LB	LEACH BASIN
LOG	LIMIT OF GRADING
LP	LIGHT POLE
LT	LEFT
MAX	MAXIMUM
MB	MAILBOX
MH	MANHOLE
MHB	MASSACHUSETTS HIGHWAY BOUND
MIN	MINIMUM
NIC	NOT IN CONTRACT
NO.	NUMBER
PC	POINT OF CURVATURE
PCC	POINT OF COMPOUND CURVATURE
P.G.L.	PROFILE GRADE LINE
PI	POINT OF INTERSECTION
POC	POINT ON CURVE
POT	POINT ON TANGENT
PRC	POINT OF REVERSE CURVATURE
PROJ	PROJECT
PROP	PROPOSED
PSB	PLANTABLE SOIL BORROW

ABBREVIATIONS (cont.)

GENERAL	
PT	POINT OF TANGENCY
PVC	POINT OF VERTICAL CURVATURE
PVI	POINT OF VERTICAL INTERSECTION
PVT	POINT OF VERTICAL TANGENCY
PVMT	PAVEMENT
R	RADIUS OF CURVATURE
R&D	REMOVE AND DISPOSE
RCP	REINFORCED CONCRETE PIPE
RD	ROAD
RDWY	ROADWAY
REM	REMOVE
RET	RETAIN
RET WALL	RETAINING WALL
ROW	RIGHT OF WAY
RR	RAILROAD
RRFB	RECTANGULAR RAPID FLASHING BEACON
R&R	REMOVE AND RESET
R&S	REMOVE AND STACK
RT	RIGHT
SB	STONE BOUND
SB	SERVICE BOX
SHLD	SHOULDER
SMH	SEWER MANHOLE
ST	STREET
STA	STATION
SSD	STOPPING SIGHT DISTANCE
SHLO	STATE HIGHWAY LAYOUT LINE
SW	SIDEWALK
T	TANGENT DISTANCE OF CURVE/TRUCK %
TAN	TANGENT
TEMP	TEMPORARY
TC	TOP OF CURB
TOS	TOP OF SLOPE
TYP	TYPICAL
UP	UTILITY POLE
VAR	VARIES
VERT	VERTICAL
VC	VERTICAL CURVE
WCR	WHEEL CHAIR RAMP
WG	WATER GATE
WIP	WROUGHT IRON PIPE
WM	WATER METER/WATER MAIN
X-SECT	CROSS SECTION

TRAFFIC SIGNAL

CAB.	CABINET
CCVE	CLOSED CIRCUIT VIDEO EQUIPMENT
DW	STEADY DON'T WALK
FDW	FLASHING DON'T WALK
FR	FLASHING CIRCULAR RED
FRL	FLASHING RED LEFT ARROW
FRR	FLASHING RED RIGHT ARROW
FY	FLASHING CIRCULAR YELLOW
FYL	FLASHING YELLOW LEFT ARROW
FYR	FLASHING YELLOW RIGHT ARROW
G	STEADY CIRCULAR GREEN
GL	STEADY GREEN LEFT ARROW
GR	STEADY GREEN RIGHT ARROW
GSL	STEADY GREEN SLASH LEFT ARROW
GSR	STEADY GREEN SLASH RIGHT ARROW
GV	STEADY GREEN VERTICAL ARROW
OL	OVERLAP
PED	PEDESTRIAN
PTZ	PAN, TILE, ZOOM
R	STEADY CIRCULAR RED
RL	STEADY RED LEFT ARROW
RR	STEADY RED RIGHT ARROW
TR SIG	TRAFFIC SIGNAL
TSC	TRAFFIC SIGNAL CONDUIT
W	STEADY WALK
Y	STEADY CIRCULAR YELLOW
YL	STEADY YELLOW LEFT ARROW

CITY OF NEWTON
MASSACHUSETTS
LEGEND & ABBREVIATIONS
FOR THE
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AT
PETTEE SQUARE
OAK STREET AT CHESTNUT STREET

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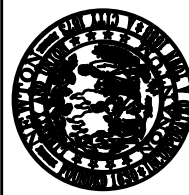
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MASSACHUSETTS



CONSTRUCTION NOTES:

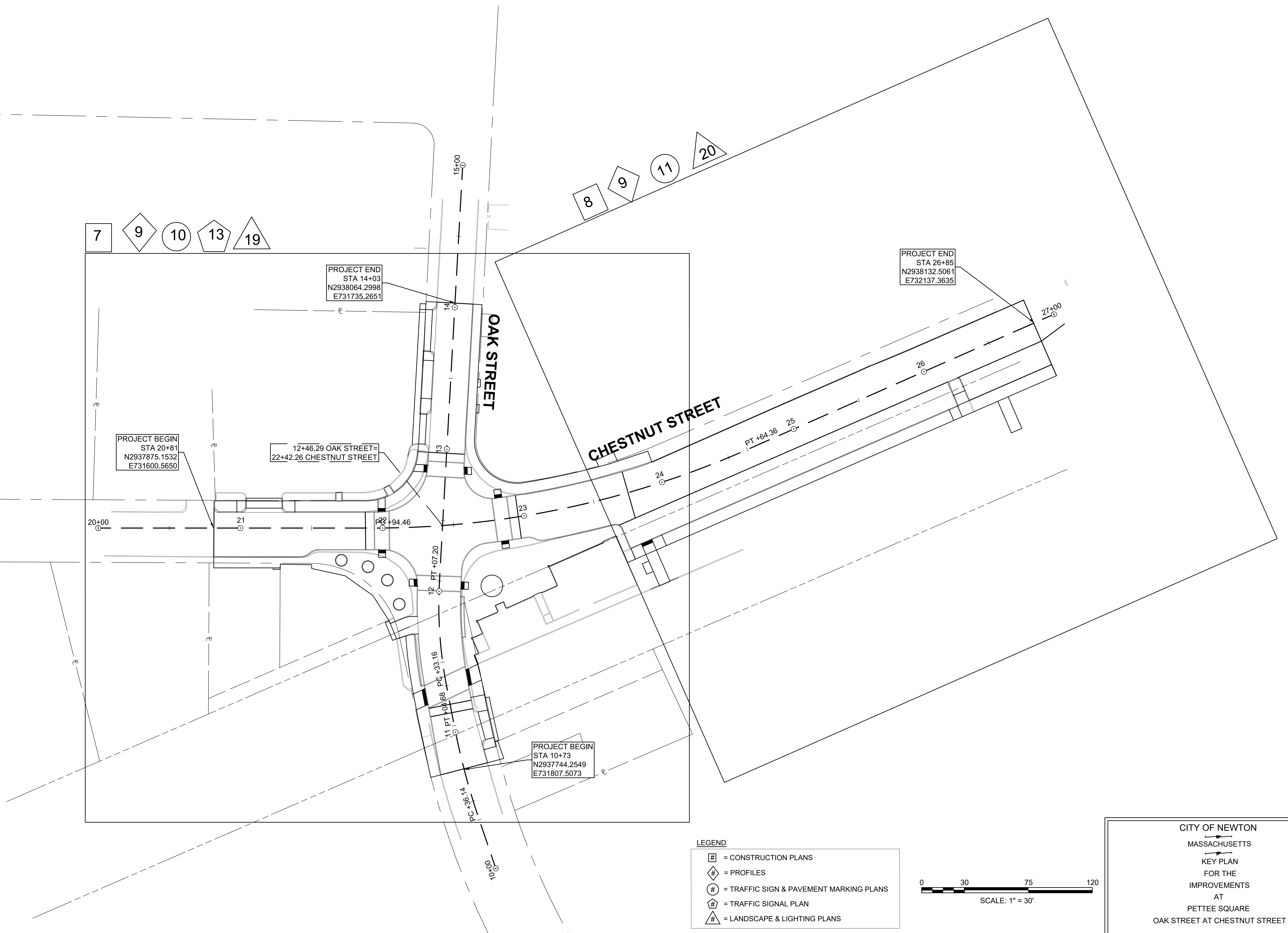
- EXISTING CONDITIONS INFORMATION COMPILED FROM SURVEY BY HANCOCK SURVEY ASSOCIATES, BOSTON, MA PERFORMED IN JULY, 2020.
HORIZONTAL DATUM = NAD83 (MASSACHUSETTS STATE PLANE COORDINATES)
VERTICAL DATUM = NAVD88
- ALL EXISTING STATE, COUNTY, AND CITY LOCATION LINES HAVE BEEN ESTABLISHED FROM AN ACTUAL ON-THE-GROUND SURVEY. ALL PRIVATE PROPERTY LINES HAVE BEEN ESTABLISHED FROM AVAILABLE INFORMATION AND THEIR EXACT LOCATION ARE NOT GUARANTEED.
- THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL CONTACT DIGSAFE (1-888-DIGSAFE) A MINIMUM OF 72 HOURS PRIOR TO ANY CONSTRUCTION TO VERIFY THE LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.
- WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR, AND THE INFORMATION FURNISHED TO THE ENGINEER FOR RESOLUTION OF THE CONFLICT.
- ALL MUNICIPALLY OWNED UTILITY STRUCTURES (CATCH BASINS, DRAIN MANHOLES, WATER GATES, ETC.) SHALL BE ADJUSTED BY THE CONTRACTOR TO FINISHED GRADE UNLESS DIRECTED OTHERWISE.
- ALL PRIVATELY OWNED UTILITY STRUCTURES (GAS GATES, ELECTRIC /TELEPHONE MANHOLES, ETC.) SHALL BE ADJUSTED TO FINISHED GRADE BY THE PRIVATE UTILITY COMPANY, UNLESS DIRECTED OTHERWISE. THE CONTRACTOR SHALL COORDINATE WITH PRIVATE UTILITY COMPANIES FOR THE ALTERATION AND ADJUSTMENT, AS NECESSARY.
- PROPOSED LATERAL DRAIN PIPES SHALL BE INSTALLED WITH A PITCH OF 1.0% (TYP) / 0.5% (MINIMUM) UNLESS OTHERWISE NOTED.
- AREAS OUTSIDE THE LIMITS OF PROPOSED WORK DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED BY THE CONTRACTOR TO THEIR ORIGINAL CONDITION AT THE CONTRACTORS EXPENSE.
- ALL DISTURBED AREAS OUTSIDE THE CURBLINE SHALL BE STABILIZED WITH 4" LOAM AND SEED, UNLESS OTHERWISE NOTED.
- THE TERM "PROPOSED" (PROP) MEANS WORK TO BE CONSTRUCTED USING NEW MATERIALS OR, WHERE APPLICABLE, RE-USING EXISTING MATERIALS IDENTIFIED AS "REMOVE AND RESET" (R&R), AS APPROVED BY THE ENGINEER.
- THE TERM "MEET EXIST" MEANS TO MEET BOTH THE EXISTING ALIGNMENT AND ELEVATION.
- AN UNOBSTRUCTED PATH OF TRAVEL WITH A MINIMUM WIDTH OF 3'-0" (EXCLUDING THE WIDTH OF CURB) SHALL BE MAINTAINED PAST ALL OBSTRUCTIONS (UTILITY POLES, LIGHT POLES, SIGNS, MAILBOXES, ALONG DRIVEWAY OPENINGS, ETC.)
- DETECTABLE WARNING PANELS ARE REQUIRED ON ALL PROPOSED WHEELCHAIR RAMPS AND SHALL BE INSTALLED IN ACCORDANCE WITH MASSDOT CONSTRUCTION STANDARDS.
- IN INSTANCES WHERE AN EXISTING MANHOLE, HANDHOLE, OR OTHER "SURFACE" TYPE STRUCTURE THAT CANNOT BE REMOVED OR RESET IS WITHIN THE PROPOSED OR EXISTING (IF RECIPROCAL OR WITHIN PROJECT LIMITS) CURB RAMP, THE STRUCTURE SHALL BE CAREFULLY ADJUSTED SUCH THAT THE TOPMOST SURFACES OR THE STRUCTURE COVER SHALL BE FLUSH WITH THE CURB RAMP SURFACES.

CITY OF NEWTON
MASSACHUSETTS
CONSTRUCTION NOTES
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PETTEE SQUARE
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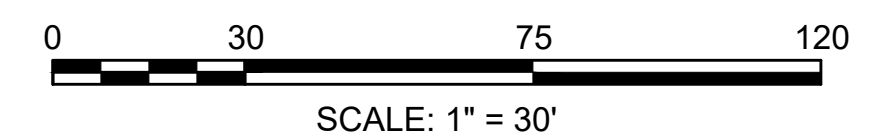
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MASSACHUSETTS

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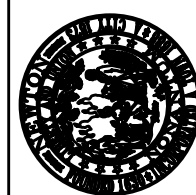


LEGEND

- [#] = CONSTRUCTION PLANS
- [#] = PROFILES
- [#] = TRAFFIC SIGN & PAVEMENT MARKING PLANS
- [#] = TRAFFIC SIGNAL PLAN
- [#] = LANDSCAPE & LIGHTING PLANS

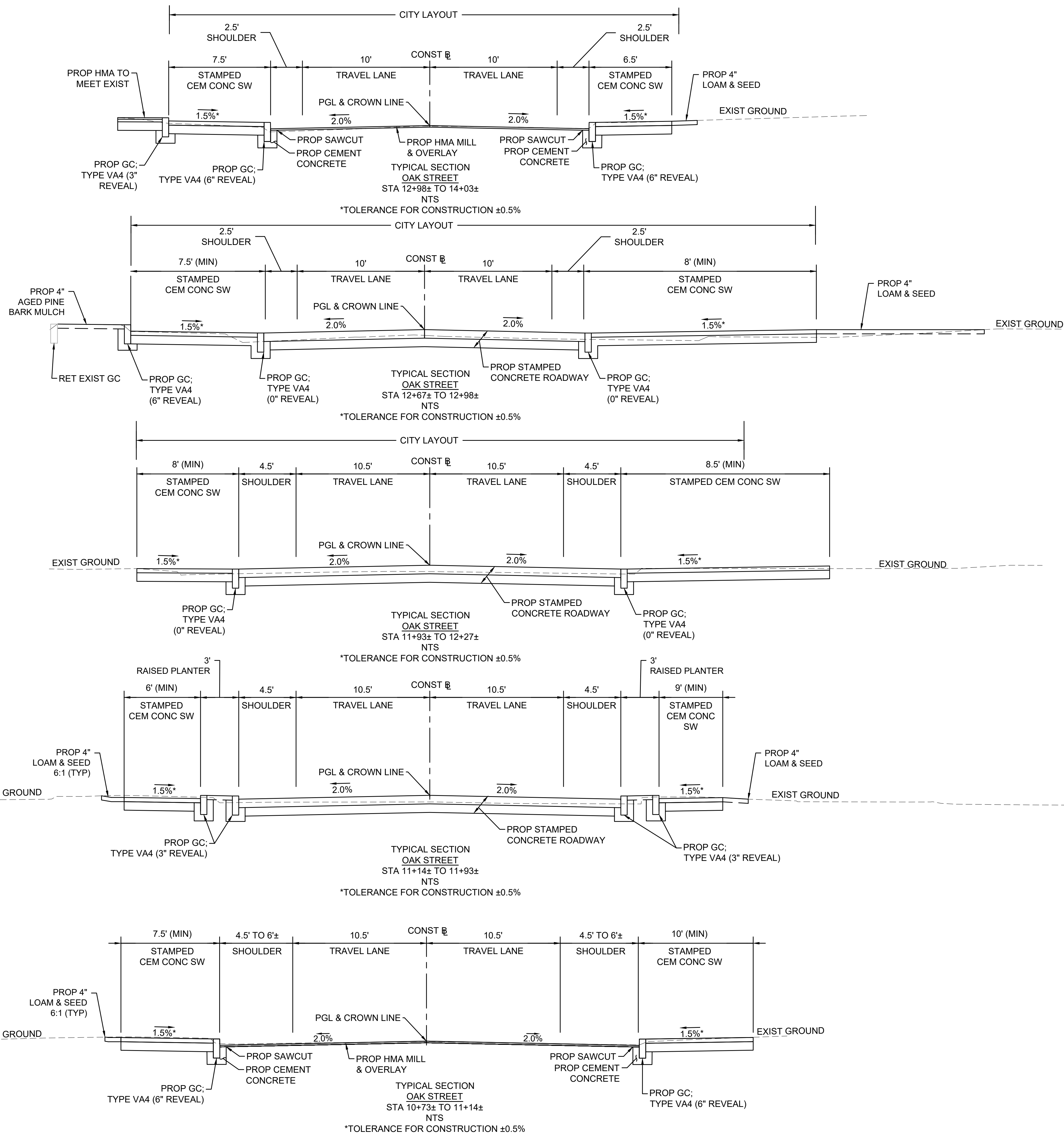


CITY OF NEWTON
MASSACHUSETTS
KEY PLAN
FOR THE
IMPROVEMENTS
AT
PETTEE SQUARE
OAK STREET AT CHESTNUT STREET



CITY OF NEWTON
MASSACHUSETTS

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PAVEMENT NOTES

PROPOSED HMA MILL & OVERLAY

SURFACE: 1½" HMA SURFACE COURSE OVER
VARIABLE DEPTH (COMPACTED IN 2" MAX LIFTS) LEVELING COURSE
(AS REQUIRED TO MEET PROPOSED LINES AND GRADES) OVER
VARIABLE DEPTH (MIN 1½") PAVEMENT MICROMILLING (SEE NOTE 6 BELOW)

PROPOSED FULL DEPTH PAVEMENT

SURFACE: 1½" HMA SURFACE COURSE OVER
2" HMA INTERMEDIATE COURSE OVER

BASE: 4" HMA BASE COURSE COURSE OVER

SUBBASE: 4" DENSE GRADED CRUSHED STONE OVER
8" GRAVEL BORROW, TYPE b

PROPOSED STAMPED CONCRETE ROADWAY

SURFACE: 8" FIBER REINFORCED HIGH EARLY STRENGTH CEMENT CONCRETE
(4000 PSI W/ 6"X6" - W10X10 WWF)

BASE: 8" GRAVEL BORROW, TYPE b

PROPOSED STAMPED CEMENT CONCRETE WALKS/ SIDEWALKS/ WHEELCHAIR RAMPS

SURFACE: 4" CEMENT CONCRETE (AIR ENTRAINED, 4000 PSI, ¾", 610)

BASE: 8" GRAVEL BORROW, TYPE b

PROPOSED CEMENT CONCRETE SIDEWALK THROUGH DRIVEWAY

SURFACE: 6" CEMENT CONCRETE (AIR ENTRAINED, 4000 PSI, ¾", 610)

BASE: 8" GRAVEL BORROW, TYPE b

PROPOSED HMA DRIVEWAY (TO MATCH EXISTING)

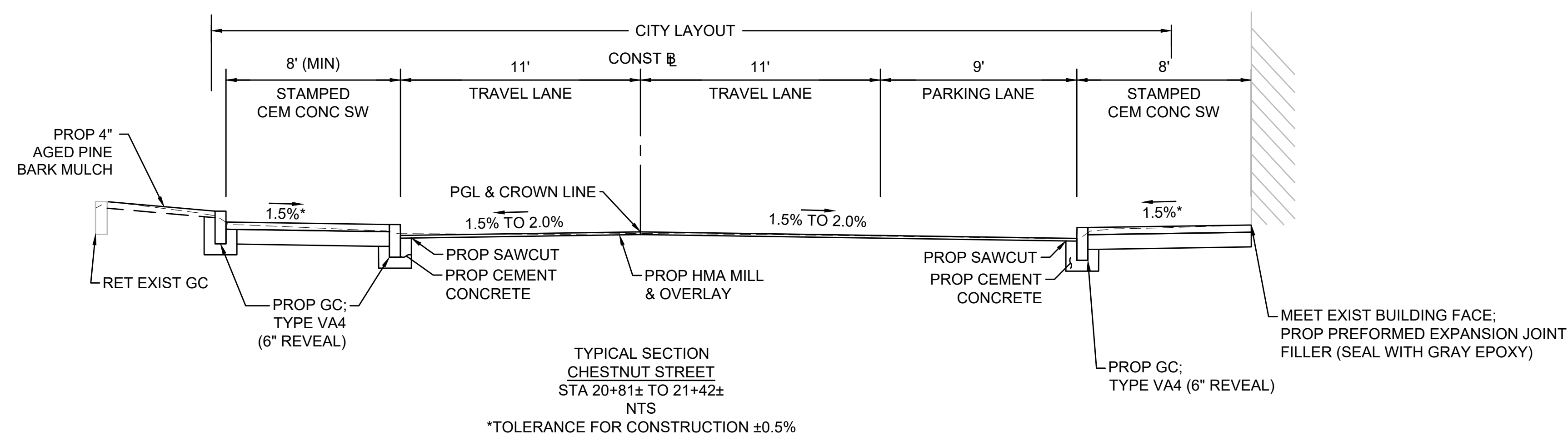
SURFACE: 1½" HMA SURFACE COURSE OVER
2½" HMA INTERMEDIATE COURSE OVER

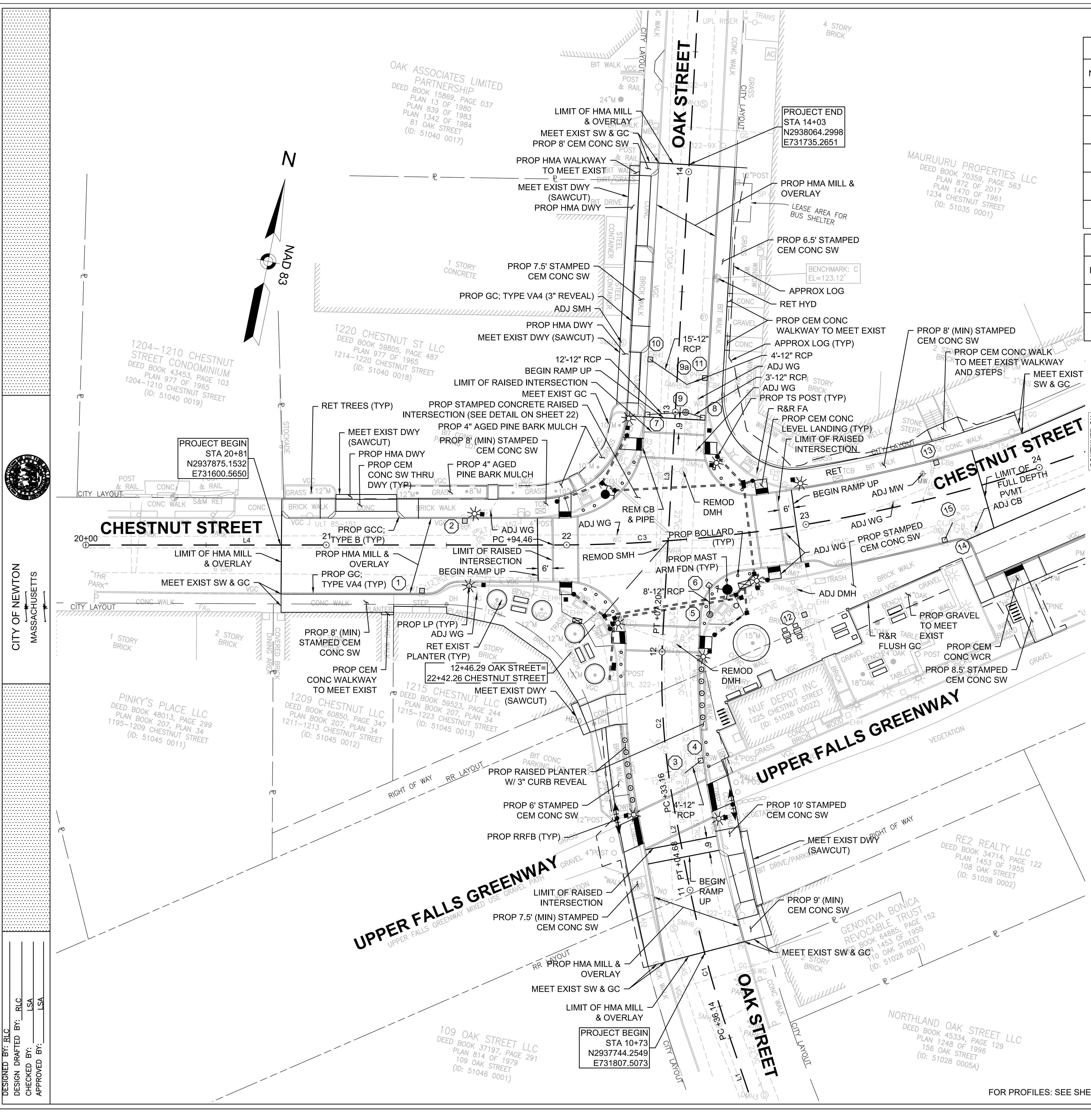
BASE: 8" SUITABLE EXISTING GRAVEL;
ADD GRAVEL BORROW, TYPE b AS REQUIRED

GENERAL PAVEMENT NOTES:

1. ASPHALT EMULSION FOR TACK COAT SHALL BE APPLIED BETWEEN ALL ASPHALT SURFACES AND SAWCUT JOINTS BEFORE PAVING. HMA JOINT SEALANT SHALL BE APPLIED TO ALL COLD JOINTS (LONGITUDINAL AND TRANSVERSE) BEFORE PAVING SURFACE COURSE. ASPHALT EMULSION FOR TACK COAT SHALL BE APPLIED IN ACCORDANCE WITH SECTION 450.43. ALL SURFACES SHALL BE CLEAN OF ALL ORGANICS, DEBRIS, AND SAND PRIOR TO PAVING.
2. ALL HMA SHOULD BE IN ACCORDANCE WITH SECTION 450.
3. ASPHALT EMULSION FOR TACK COAT SHALL BE RS-1H TO RESIST TRACKING OF TACK BY HAUL VEHICLES.
4. HMA FOR WALKS AND DRIVEWAYS SHALL BE IN ACCORDANCE WITH SECTION 700.
5. ALL GRAVEL BORROW MEETING SPECIFICATIONS SHALL BE RETAINED IN PLACE, COMPACTED, AND LEVELED AS REQUIRED.
6. VARIABLE DEPTH MILLING (1½" MIN) AS REQUIRED TO MEET PROPOSED LINES AND GRADES WITH RESURFACING OVERLAY.

CITY OF NEWTON
MASSACHUSETTS
TYPICAL SECTIONS & PAVEMENT NOTES - 1 OF 2
FOR THE
IMPROVEMENTS
AT
PETTEE SQUARE
OAK STREET AT CHESTNUT STREET
SHEET 5 OF 33



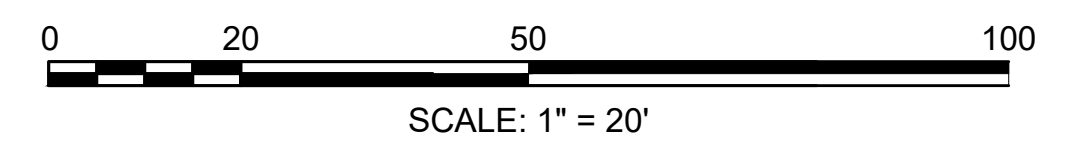


OAK STREET CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L1	10+00.00	2937680.6253	731843.2460		N30°23'15"W 36.14'	10+36.14	2937711.8025	731824.9635
C1	10+36.14	2937711.8025	731824.9635	R=500.00' Δ=7°51'14" L=68.54' T=34.32'		11+04.68	2937773.1120	731794.4481
L2	11+04.68	2937773.1120	731794.4481		N22°32'02"W 28.48'	11+33.16	2937799.4187	731783.5334
C2	11+33.16	2937799.4187	731783.5334	R=300.00' Δ=14°08'29" L=74.04' T=37.21'		12+07.20	2937870.6013	731763.8420
L3	12+07.20	2937870.6013	731763.8420		N8°23'33"W 292.80'	15+00.00	2938160.2611	731721.1077

CHESTNUT STREET CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L4	20+00.00	2937858.8770	731521.2171		N78°24'29"E 194.46'	21+94.46	2937897.9519	731711.7112
C3	21+94.46	2937897.9519	731711.7112	R=650.00' Δ=23°47'26" L=269.89' T=136.92'		24+64.36	2938004.7458	731957.4707

PROPOSED DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. ELEV. IN	INV. ELEV. OUT	REMARKS
1	PROP CBCI	21+39.8, 19.0' RT	118.14	-	114.7 (EX)	4' SUMP; REM EXIST CB
2	PROP CBCI	21+57.6, 10.0' LT	118.55	-	115.6 (EX)	4' SUMP; REM EXIST CB
3	EXIST DMH	11+48.5, 6.7' RT	119.02	110.9 (EX) 110.6 (EX) 110.4 (EX) 115.38 (FROM 4)	109.9 (EX)	CORE HOLE IN EXIST
4	PROP CB	11+53.0, 14.0' RT	118.98	-	115.48	4' SUMP
5	CIT TO DMH	12+16.7, 19.0' RT	120.00	-	115.4 (EX)	
6	PROP CB	12+28.7, 18.1' RT	120.01	-	116.51	4' SUMP
7	PROP SPECIAL CB	12+98.2, 11.5' LT	120.12	-	117.12	SHALLOW; 4' SUMP
8	PROP CB	12+98.2, 11.5' LT	120.12	-	116.62	OFFSET TOP; 4' SUMP
9	PROP DMH	13+00.1, 4.3' RT	120.27	117.02 (FROM 7) 116.52 (FROM 8)	MATCH EXIST (111.6±)	CONSTRUCT OVER EXIST PIPE
9a	EXIST DMH	13+11.6, 4.2' RT	120.34	117.17 (FROM 8) 116.62 (FROM 11)	MATCH EXIST (111.8±)	
10	PROP SPECIAL CB	13+21.2, 11.5' LT	120.27	-	117.27	SHALLOW; 4' SUMP; REM EXIST CB
11	PROP CBCI	13+14.7, 11.5' RT	120.22	117.5 (EX)	116.72	OFFSET TOP; 4' SUMP; REM EXIST CB
12	PROP CB	22+93.7, 37.0' RT	119.64	117.0 (EX)	114.8 (EX)	4' SUMP; REM EXIST CB
13	PROP CBCI	23+59.0, 14.0' LT	119.46	117.1 (EX)	114.8 (EX)	4' SUMP; REM EXIST CB
14	PROP CB	23+54.5, 18.0' RT	119.33	-	115.83	4' SUMP
15	EXIST DMH	23+59.4, 11.8' RT	119.59	111.4 (EX) 114.4 (EX) 115.73 (FROM 14)	111.4 (EX)	CORE HOLE IN EXIST

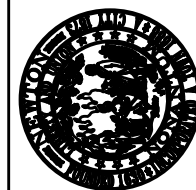
EXISTING DRAINAGE TABLE				
CB1 RIM=117.85' INV=114.7'	CB6 RIM=119.09' INV=115.4'	DMH1 RIM=119.54' A=110.6' B=114.5' C=110.6' D=110.5'	DMH4 RIM=120.28' A=111.4' B=111.4' C=112.8'	SMH1 RIM=125.63' SMH2 RIM=124.25'
CB2 RIM=118.12' INV=115.6'	CB7 RIM=119.64' A=114.8' B=117.0'	DMH2 RIM=118.52' A=110.9' B=109.9' C=110.6' D=110.4'	DMH5 RIM=120.15'	SMH3 RIM=122.52'
CB3 RIM=119.71' INV=114.1'	CB8 RIM=119.21' A=117.2' B=117.1'	DMH6 RIM=119.93' NOT OPENED CRACKED COVER	DMH7 RIM=119.64' A=111.4' B=114.4' C=111.4'	SMH4 RIM=120.77' SMH5 RIM=120.20'
CB4 RIM=119.76' INV=117.4'	CB9 RIM=119.27' INV=114.4'	DMH3 RIM=115.87' A=108.3' B=108.3'		SMH6 RIM=117.18'
CB5 RIM=119.83' A=117.5' B=117.2'				SMH7 RIM=116.54'



CITY OF NEWTON
MASSACHUSETTS
CONSTRUCTION PLANS - 1 OF 2
FOR THE
IMPROVEMENTS
AT
PETTEE SQUARE
OAK STREET AT CHESTNUT STREET
SHEET 7 OF 33

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DESIGN DRAFTED BY: RLC
CHECKED BY: LSA
APPROVED BY: LSA

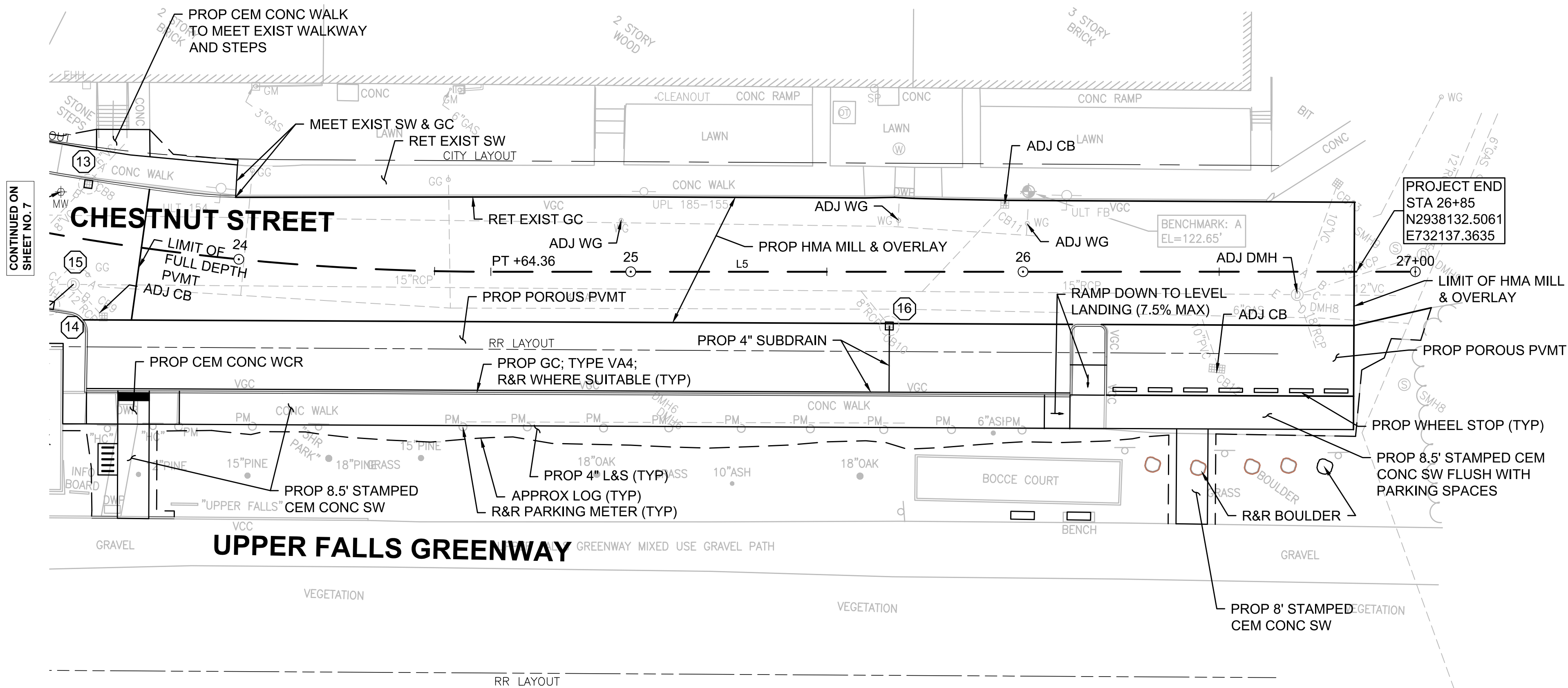
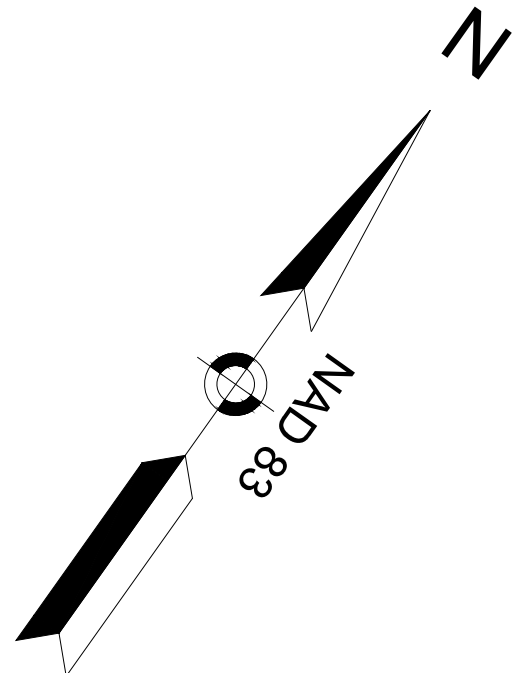
FOR PROFILES: SEE SHEET NO. 9



CITY OF NEWTON
MASSACHUSETTS

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CHECKED BY: LSA
APPROVED BY: LSA

MAURUURU PROPERTIES LLC
DEED BOOK 70359, PAGE 563
PLAN 1470 OF 2017 563
1234 CHESTNUT STREET
(10: 51035 0001)



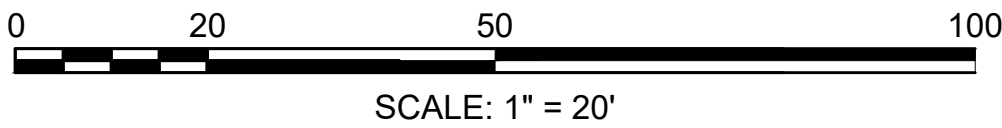
CHESTNUT STREET CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
C3	21+94.46	2937897.9519	731711.7112	R = 650.00' Δ= 23°47'26" L=269.89' T=136.92'		24+64.36	2938004.7458	731957.4707
L5	24+64.36	2938004.7458	731957.4707		N54°37'03"E 235.64'	27+00.00	2938141.1916	732149.5931

PROPOSED DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. ELEV. IN	INV. ELEV. OUT	REMARKS
13	PROP CBCI	23+59.0, 14.0' LT	119.43	117.1 (EX)	114.8 (EX)	4' SUMP; REM EXIST CB
14	PROP CB	23+54.5, 18.0' RT	119.33	-	115.83	4' SUMP
15	EXIST DMH	23+59.4, 11.8' RT	119.59	111.4 (EX) 114.4 (EX) 115.73 (FROM 14)	111.4 (EX)	CORE HOLE IN EXIST
16	PROP SPECIAL CB	25+65.9, 13.8' RT	119.35	116.35	116.3 (EX)	SHALLOW; 4' SUMP

EXISTING DRAINAGE TABLE

CB10	DMH8	SMH8
RIM=118.69'	RIM=120.10'	RIM=120.12'
INV=116.3'	A=114.6'	
	B=115.2'	SMH9
CB11	C=113.9'	RIM=120.06'
RIM=119.18'	D=114.1'	
INV=117.2'	E=113.9'	
CB12	DMH9	
RIM=119.57'	RIM=119.92'	
INV=115.7'	A=116.6'	
	B=115.0'	
CB13		C=115.1'
RIM=119.39'		
INV=117.0'		
CB14		
RIM=119.32'		
INV=116.7'		

FOR PROFILE: SEE SHEET NO. 9



CITY OF NEWTON
MASSACHUSETTS
CONSTRUCTION PLANS - 1 OF 2
FOR THE
IMPROVEMENTS
AT
PETTEE SQUARE
OAK STREET AT CHESTNUT STREET

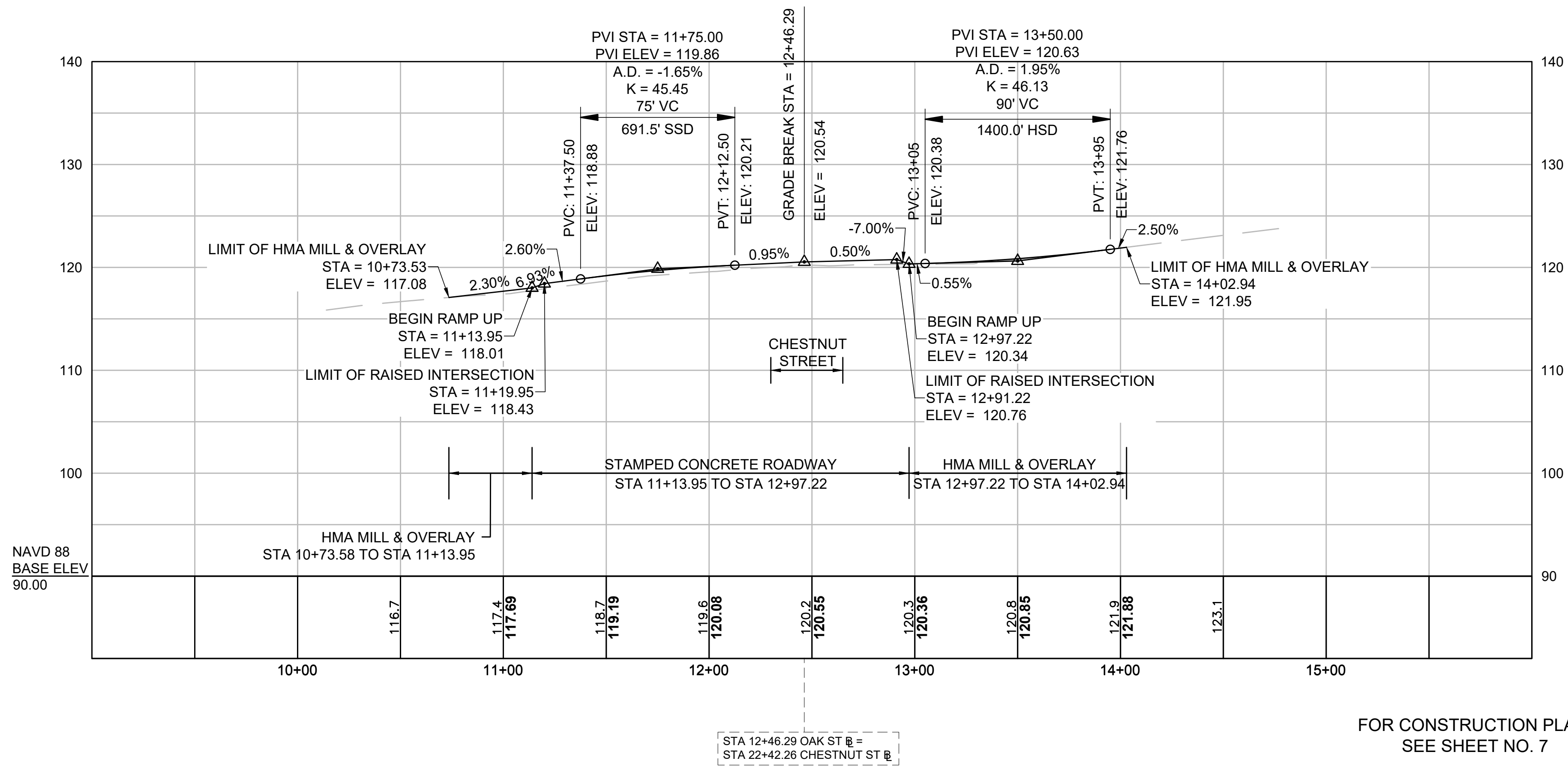
SHEET 8 OF 33



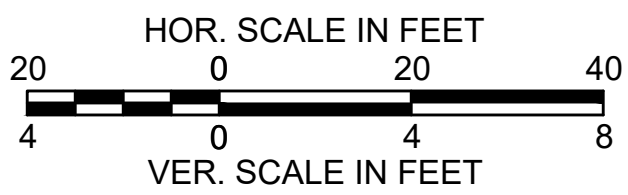
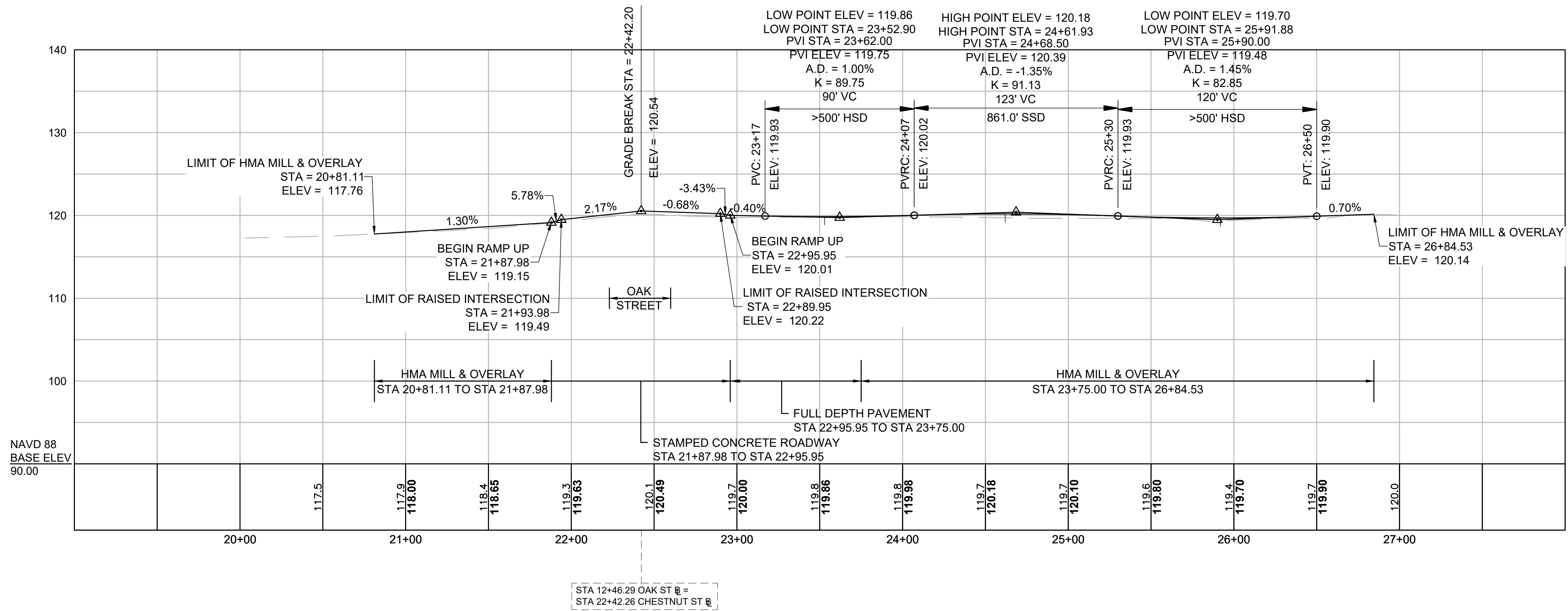
CITY OF NEWTON
MASSACHUSETTS

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APPROVED BY: LSA

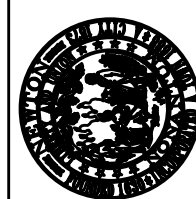
OAK STREET



CHESTNUT STREET

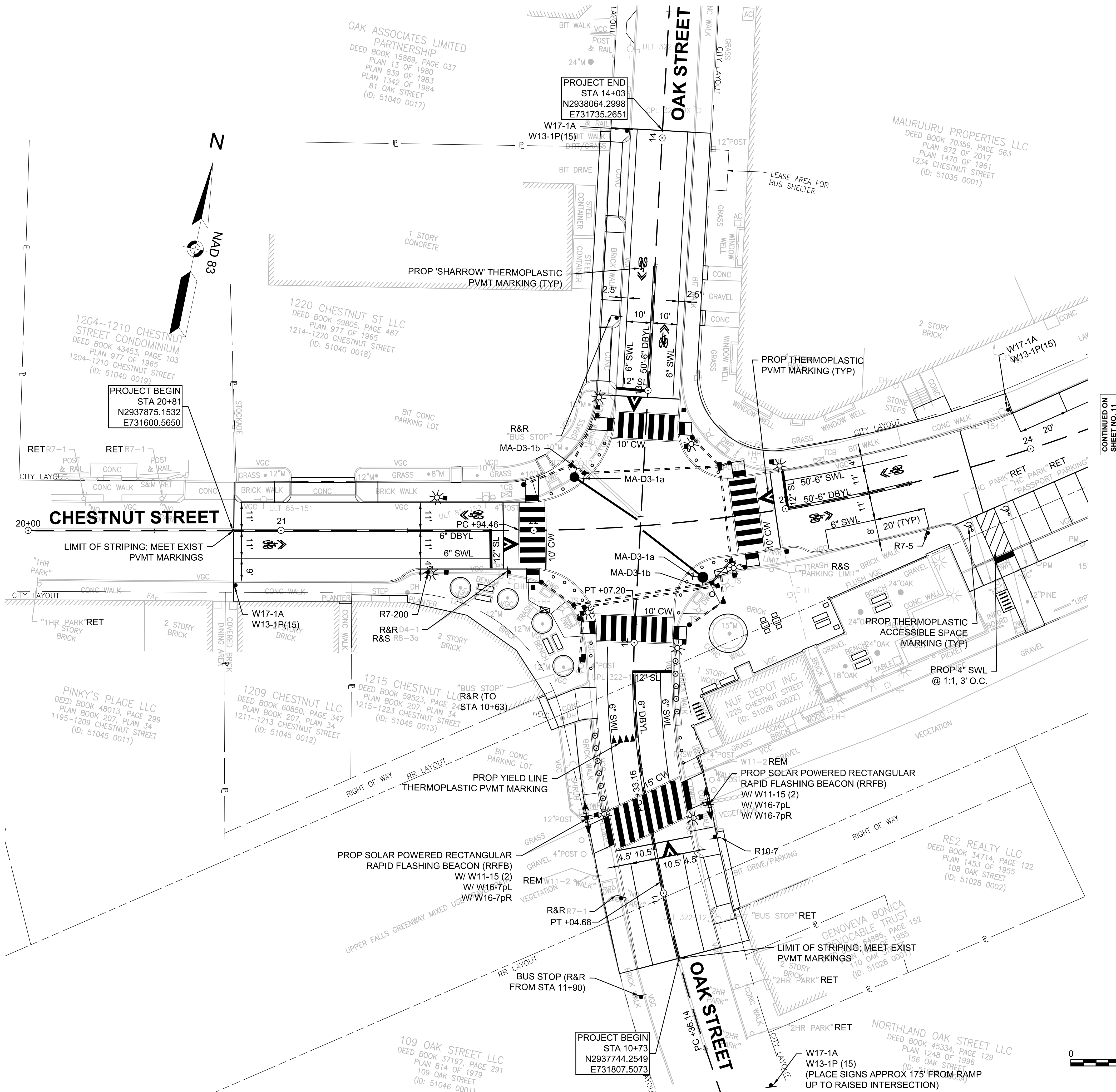


CITY OF NEWTON
MASSACHUSETTS
PROFILES
FOR THE
IMPROVEMENTS
AT
PETTEE SQUARE
OAK STREET AT CHESTNUT STREET



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MASSACHUSETTS

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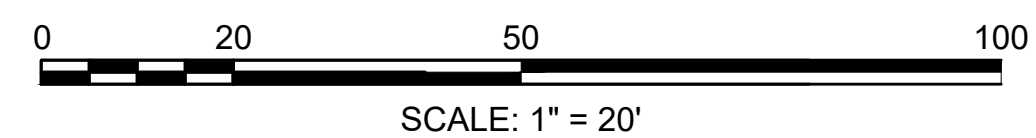


CONTINUED ON
SHEET NO. 11

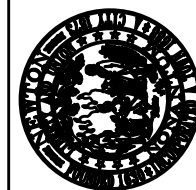
NOTES:

1. ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE RETAINED UNLESS INDICATED OTHERWISE ON THE DRAWINGS.
2. ALL PAVEMENT MARKINGS WITHIN THE LIMITS OF WORK SHALL BE THERMOPLASTIC MATERIALS.
3. IN AREAS WHERE THE EXISTING PAVEMENT IS BEING RETAINED, ALL EXISTING PAVEMENT MARKINGS IN CONFLICT WITH PROPOSED PAVEMENT MARKINGS SHALL BE REMOVED BY APPROVED METHODS.
4. A MINIMUM OF 3'-0" PATH OF TRAVEL CLEARANCE, EXCLUDING CURB, IS REQUIRED WHEN PLACING SIGNS.
5. THE MINIMUM MOUNTING HEIGHT OF POST MOUNTED SIGNS, MEASURED VERTICALLY FROM THE BOTTOM OF THE SIGN TO THE TOP OF THE CURB OR SIDEWALK SHALL BE 7 FEET. SIGNS WITHIN 3 FEET OF THE SHARED USE PATH SHALL BE MOUNTED WITH 8 FOOT MINIMUM VERTICAL CLEARANCE.

FOR SIGN SUMMARY: SEE SHEET 12



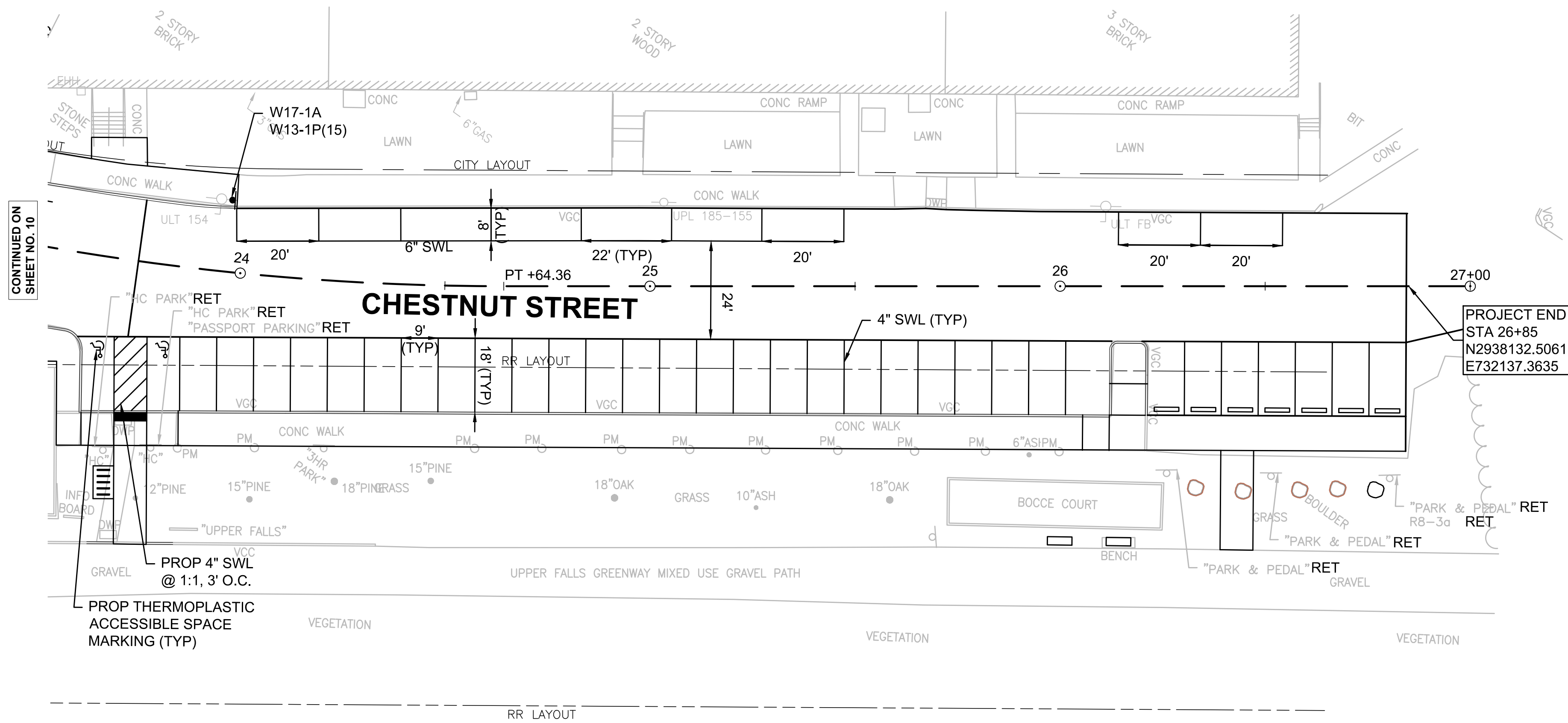
CITY OF NEWTON
MASSACHUSETTS
TRAFFIC SIGNS & PAVEMENT MARKINGS - 1 OF 2
FOR THE
IMPROVEMENTS
AT
PETTEE SQUARE
OAK STREET AT CHESTNUT STREET
SHEET 10 OF 33



CITY OF NEWTON
MASSACHUSETTS

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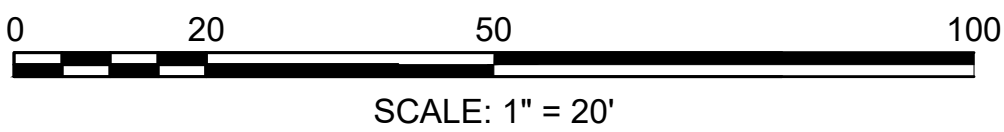
PROPERTIES LLC
1234 CHESTNUT STREET
(01035 0001)
10359, PAGE 563
LAW 1470 OF 2017
1234 CHESTNUT STREET
(01035 0001)



NOTES:




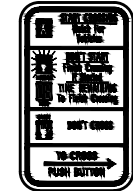







- ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE RETAINED UNLESS INDICATED OTHERWISE ON THE DRAWINGS.
- ALL PAVEMENT MARKINGS WITHIN THE LIMITS OF WORK SHALL BE THERMOPLASTIC MATERIALS.
- IN AREAS WHERE THE EXISTING PAVEMENT IS BEING RETAINED, ALL EXISTING PAVEMENT MARKINGS IN CONFLICT WITH PROPOSED PAVEMENT MARKINGS SHALL BE REMOVED BY APPROVED METHODS.
- A MINIMUM OF 3'-0" PATH OF TRAVEL CLEARANCE, EXCLUDING CURB, IS REQUIRED WHEN PLACING SIGNS.
- THE MINIMUM MOUNTING HEIGHT OF POST MOUNTED SIGNS, MEASURED VERTICALLY FROM THE BOTTOM OF THE SIGN TO THE TOP OF THE CURB OR SIDEWALK SHALL BE 7 FEET. SIGNS WITHIN 3 FEET OF THE SHARED USE PATH SHALL BE MOUNTED WITH 8 FOOT MINIMUM VERTICAL CLEARANCE.

FOR SIGN SUMMARY: SEE SHEET 12



CITY OF NEWTON
MASSACHUSETTS
TRAFFIC SIGN & PAVEMENT MARKINGS - 2 OF 2
FOR THE
IMPROVEMENTS
AT
PETTEE SQUARE
OAK STREET AT CHESTNUT STREET

NOTES:
1. SEE 2009 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR
STREETS AND HIGHWAYS FOR TEXT AND LEGEND DIMENSIONS.

TRAFFIC SIGN SUMMARY													
IDENTIFICATION NUMBER	SIZE OF SIGN (in)		LEGEND	TEXT DIMENSIONS (in)			NUMBER OF SIGNS REQUIRED	COLOR			SIZE AND NUMBER OF POSTS REQUIRED	UNIT AREA (SF)	TOTAL AREA (SF)
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR		BACK- GROUND	LEGEND	BORDER			
MA-D3-1a	33	12	SEE RIGHT	6D / 4D	3 3	N/A	2	GREEN	WHITE	WHITE	MOUNT ON MAST ARM POLE	PAID FOR UNDER ITEM 874.	
MA-D3-1b	48	12	SEE RIGHT	6D / 4D	3 3	N/A	2	GREEN	WHITE	WHITE	MOUNT ON MAST ARM POLE	PAID FOR UNDER ITEM 874.	
R7-5	12	18					1	WHITE	GREEN	GREEN	P5 1	1.50	1.50
R7-200	24	18					1	WHITE	RED GREEN	RED	P5 1	3.00	3.00
R10-3e	9	15					8	WHITE	BLACK	BLACK	MOUNT ON TS POSTS	PAID FOR UNDER ITEM 815.01	
R10-7	24	30					1	WHITE	BLACK	BLACK	P5 1	5.00	5.00
W11-15	30	30					4	FL. YELLOW- GREEN	BLACK	BLACK	MOUNT ON RRFB	PAID FOR UNDER ITEM 824.221	
W13-1P(15)	18	18					4	YELLOW	BLACK	BLACK	MOUNT W/ W17-1A	2.25	9.00
W16-7pL	24	12					2	FL. YELLOW- GREEN	BLACK	BLACK	MOUNT ON RRFB	PAID FOR UNDER ITEM 824.221	
W16-7pR	24	12					2	FL. YELLOW- GREEN	BLACK	BLACK	MOUNT ON RRFB	PAID FOR UNDER ITEM 824.221	
W17-1A	30	30		3C 3C 3C	2 2	N/A	4	YELLOW	BLACK	BLACK	P5 4	6.25	25.00

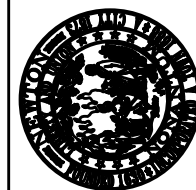
Oak St
MA-D3-1a

Chestnut St
MA-D3-1b



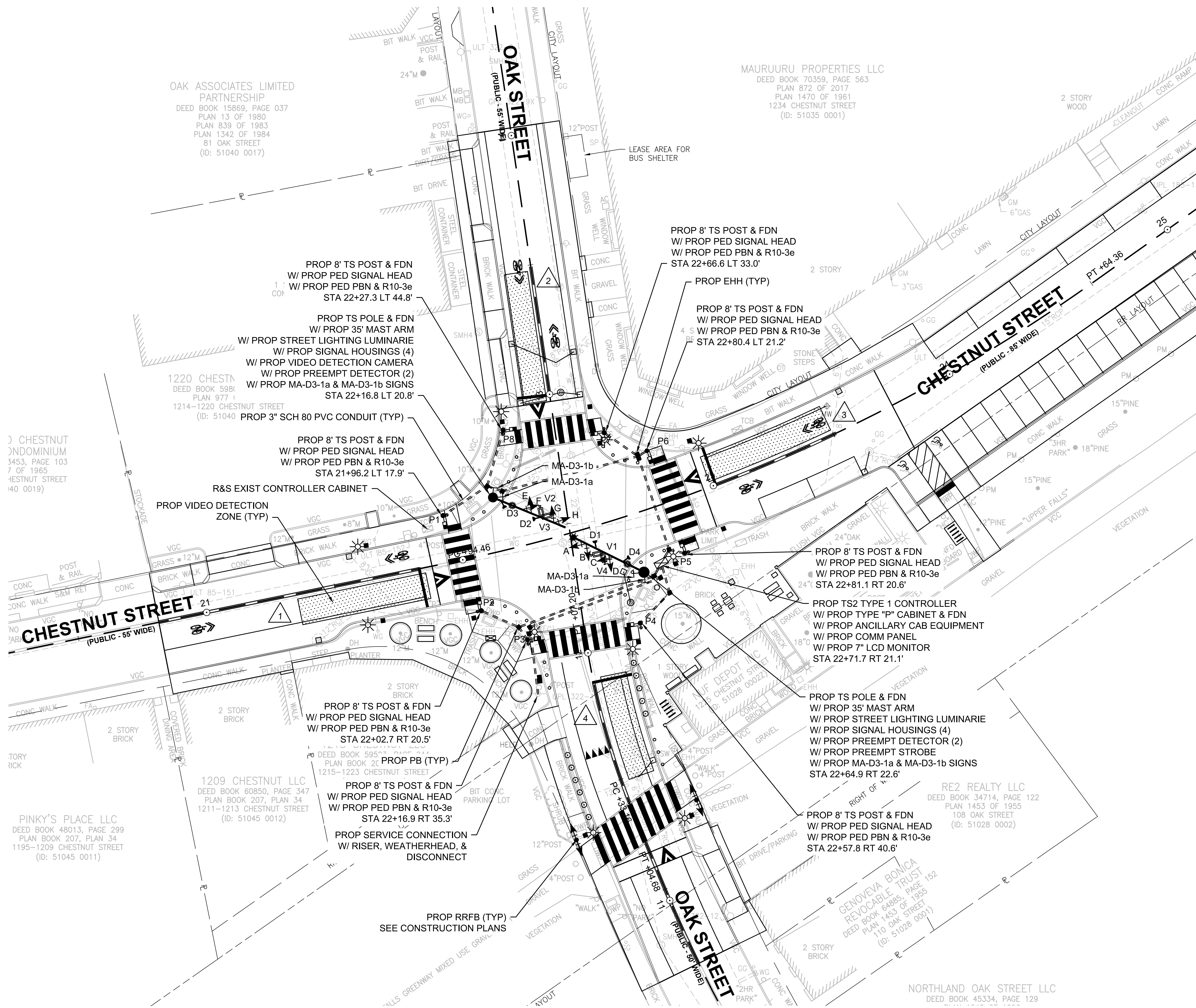
CITY OF NEWTON
MASSACHUSETTS

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DESIGN DRAFTED BY: RLC
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APPROVED BY: LSA

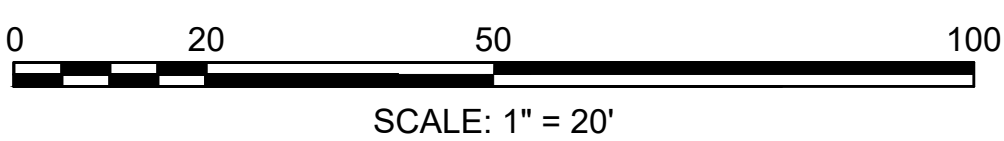


CITY OF NEWTON
MASSACHUSETTS

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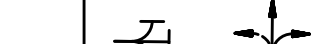
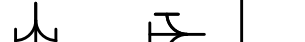

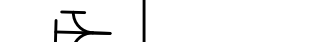





- NOTES:
1. CONTRACTOR SHALL REMOVE ALL EXISTING TRAFFIC SIGNAL PULL BOXES AND CONDUIT WITHIN AREAS OF NEWLY CONSTRUCTED SIDEWALKS.
 2. CONTRACTOR SHALL CUT EXISTING CONDUIT AT CURB LINE AND ABANDON AND PLUG ALL EXISTING CONDUIT BELOW PAVEMENT SURFACE.
 3. CONTRACTOR SHALL MAINTAIN EXISTING TRAFFIC SIGNAL OPERATIONS UNTIL NEW TRAFFIC SIGNAL OR EQUIVALENT SIGNAL COMPONENT IS FULLY-OPERATIONAL. ALL EXISTING TRAFFIC SIGNAL INFRASTRUCTURE SHALL THEN BE REMOVED AND STACKED AS NOTED.
 4. PEDESTRIAN PUSH BUTTONS SHALL BE PERPENDICULAR TO THE CROSSWALK PATH OF TRAVEL, WITH THE ARROW PROVIDED ON THE PUSH BUTTON PARALLEL TO THE CROSSWALK PATH OF TRAVEL.
 5. WHERE TWO APS PEDESTRIAN PUSH BUTTONS ARE NOT SEPARATED BY MORE THAN 10 FEET, THE AUDIBLE WALK INDICATION SHALL BE A SPEECH WALK MESSAGE.
 6. VIDEO DETECTION ZONES SHALL BE ADJUSTED IN THE FIELD IN PRESENCE OF ENGINEER.
 7. CROSSWALKS NOT SHOWN FOR VISUAL CLARITY OF TRAFFIC SIGNAL EQUIPMENT.
 8. MAST ARM POLES AND FOUNDATIONS WILL NEED TO BE INSTALLED WITH LOW-PROFILE EXCAVATION AND/OR INSTALLATION EQUIPMENT DUE TO THE CLOSE PROXIMITY WITH EXISTING OVERHEAD PRIMARY POWER LINES THAT CANNOT BE DE-ENERGIZED.
 9. CONTRACTOR SHALL COORDINATE WITH UTILITY COMPANY FOR THE SHIELDING AND INSULATION OF TRAFFIC SIGNAL EQUIPMENT AND OVERHEAD WIRES (AS NECESSARY).



CITY OF NEWTON
MASSACHUSETTS
TRAFFIC SIGNAL PLAN
FOR THE
IMPROVEMENTS
AT
PETTEE SQUARE
OAK STREET AT CHESTNUT STREET

SHEET 13 OF 33



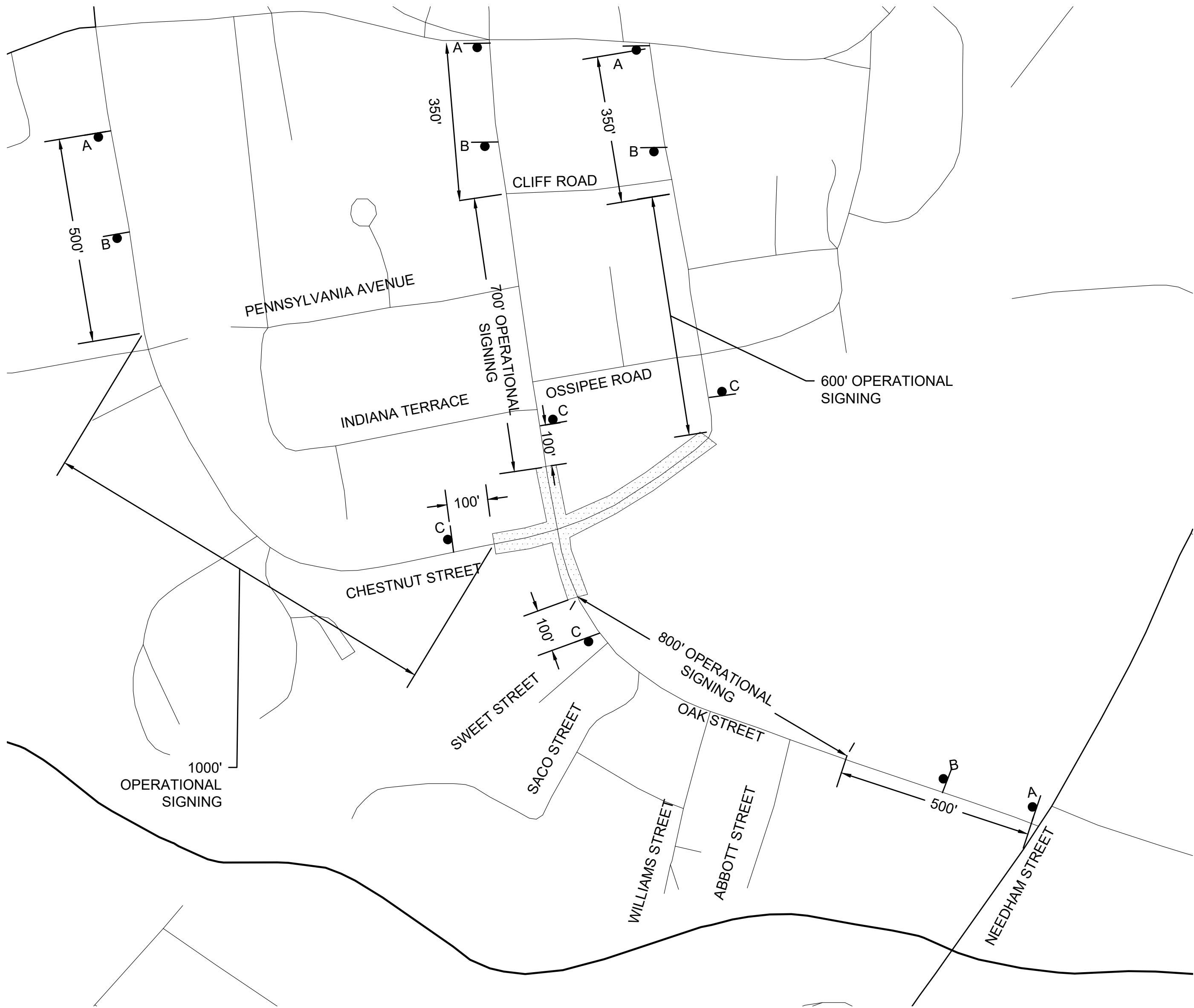
SEQUENCE AND TIMING CHART FOR FULLY-ACTUATED TRAFFIC SIGNAL CONTROL																											PRE-EMPTION PHASING AND PRIORITY																	
OAK STREET AT CHESTNUT STREET (NEWTON, MASSACHUSETTS)			Ø1			Ø2			Ø3			Ø4			Ø5			Ø6			Ø7			Ø8			Ø9 (PED)																	
			NOT USED			 			NOT USED			 			NOT USED			 			NOT USED			 			 																	
APPROACH	DIRECTION	HOUSING	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	FLASHING OPERATION	28	29	30	31	32	33	34	35	36	37	38	39		
CHESTNUT STREET	EB	A,C				R	R	R				G	Y	R				R	R	R				R	R	R	R	R	R	FR	R	R	R	G	Y	R	R	R	R	R	R	R		
CHESTNUT STREET	WB	F,H				R	R	R				R	R	R				R	R	R				G	Y	R	R	R	R	FR	R	R	R	R	R	R	R	G	Y	R	R	R	R	
OAK STREET	NB	B,D				G	Y	R				R	R	R				R	R	R				R	R	R	R	R	R	FY	R	R	R	R	R	R	G	Y	R	R	R	R	R	
OAK STREET	SB	E,G				R	R	R				R	R	R				G	Y	R				R	R	R	R	R	R	FY	G	Y	R	R	R	R	R	R	R	R	R	R	R	
PEDESTRIAN	ALL	P1-P8				DW	DW	DW				DW	DW	DW				DW	DW	DW				DW	DW	DW	W	FDW	DW	OUT	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	
MINIMUM INTERVAL						10						6						10						6						EMERGENCY ONLY	*													
VEHICLE EXTENSION						3						2						3						2																				
MAXIMUM 1						25						20						25						20																				
MAXIMUM 2						35						30						35						30																				
YELLOW CLEARANCE							3.5						3.5						3.5						3.5																			
RED CLEARANCE								1.5						1.5						1.5						1.5																		
WALK																										7.0																		
PEDESTRIAN CLEARANCE																											6.0	4.0																
RECALL								SOFT						OFF						SOFT						OFF			OFF															
DETECTOR								NON-LOCK						NON-LOCK						NON-LOCK						NON-LOCK			LOCK															



TRAFFIC SIGN SUMMARY												
IDENTIFICATION NUMBER	SIZE OF SIGN (in)		LEGEND	TEXT DIMENSIONS (in)			COLOR			NUMBER OF SIGNS REQUIRED	UNIT AREA (SF)	TOTAL AREA (SF)
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR	BACK-GROUND	LEGEND	BORDER			
MA-R2-10a	48	36		MASSDOT STANDARD SIGN			FL. ORANGE WHITE	BLACK BLACK	BLACK BLACK	4	12.00	48.00
MA-R2-10e	36	48					FL. ORANGE WHITE	BLACK BLACK	BLACK BLACK	4	12.00	48.00
R4-7	24	30					SEE 2009 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS			WHITE	BLACK	BLACK
R9-9	24	12					WHITE	BLACK	BLACK	2	2.00	4.00
R9-11aL	24	12					WHITE	BLACK	BLACK	1	2.00	2.00
R9-11aR	24	12					WHITE	BLACK	BLACK	1	2.00	2.00
W1-4L	36	36					FL. ORANGE	BLACK	BLACK	2	9.00	18.00
W1-4R	36	36					FL. ORANGE	BLACK	BLACK	2	9.00	18.00
W5-1	36	36					FL. ORANGE	BLACK	BLACK	4	9.00	36.00
W11-2	30	30					FL. YELLOW-GREEN	BLACK	BLACK	4	6.25	25.00
W16-7pL	24	12					FL. YELLOW-GREEN	BLACK	BLACK	4	2.00	8.00
W20-1	36	36					FL. ORANGE	BLACK	BLACK	4	9.00	36.00
W20-4	36	36					FL. ORANGE	BLACK	BLACK	4	9.00	36.00
MA-W20-7b	36	36					MASSDOT STANDARD SIGN			FL. ORANGE	BLACK	BLACK
W21-5aR	36	36		SEE 2009 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS			FL. ORANGE	BLACK	BLACK	1	9.00	9.00
MA-W30-8R	36	36		MASSDOT STANDARD SIGN			FL. ORANGE	BLACK	BLACK	2	9.00	18.00

NOTES:

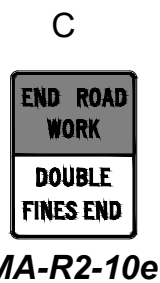
- ALL TEMPORARY TRAFFIC CONTROL WORK SHALL CONFORM TO THE LATEST EDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) AND ALL REVISIONS, UNLESS SUPERCEDED BY THESE PLANS.
- ALL SIGN LEGENDS, BORDERS, AND MOUNTING SHALL BE IN ACCORDANCE WITH THE MUTCD.
- TEMPORARY CONSTRUCTION SIGNING AND ALL OTHER TRAFFIC CONTROL DEVICES SHALL BE IN PLACE PRIOR TO THE START OF ANY WORK.
- TEMPORARY CONSTRUCTION SIGNING, BARRICADES, AND ALL OTHER NECESSARY WORK ZONE TRAFFIC CONTROL DEVICES SHALL BE REMOVED FROM THE HIGHWAY OR COVERED WHEN THEY ARE NOT REQUIRED FOR CONTROL OF TRAFFIC.
- SIGNS AND SIGN SUPPORTS LOCATED ON OR NEAR THE TRAVELED WAY, CHANNELIZING DEVICES, BARRIERS, AND CRASH ATTENUATORS MUST PASS THE CRITERIA SET FORTH IN THE "MANUAL FOR ASSESSING SAFETY HARDWARE" (MASH).
- CONTRACTORS SHALL NOTIFY EACH ABUTTER AT LEAST 24 HOURS IN ADVANCE OF THE START OF ANY WORK THAT WILL REQUIRE THE TEMPORARY CLOSURE OF ACCESS, SUCH AS CONDUIT INSTALLATION, EXISTING PAVEMENT EXCAVATION, TEMPORARY DRIVEWAY PAVEMENT PLACEMENT, AND SIMILAR OPERATIONS.
- THE FIRST TEN PLASTIC DRUMS OF A TAPER SHALL BE MOUNTED WITH SEQUENTIAL FLASHING LIGHTS.
- THE ADVISORY SPEED LIMIT, IF REQUIRED, SHALL BE DETERMINED BY THE ENGINEER.
- DISTANCES ARE A GUIDE AND MAY BE ADJUSTED IN THE FIELD BY THE ENGINEER.
- MAXIMUM SPACING OF TRAFFIC DEVICES IN A TAPER (DRUMS OR CONES) IS EQUAL IN FEET TO THE SPEED LIMIT IN MPH.
- MINIMUM LANE WIDTH IS TO BE 11 FEET UNLESS OTHERWISE SHOWN. MINIMUM LANE WIDTH TO BE MEASURED FROM THE EDGE OF DRUMS OR MEDIAN BARRIER.
- ALL SIGNS SHALL BE MOUNTED ON THEIR OWN STANDARD SIGN SUPPORTS.
- NO WORK THAT IMPACTS THE TRAVELED WAY SHALL BE PERMITTED DURING PEAK HOUR TRAFFIC. PEAK HOUR IS DEFINED AS WEEKDAYS FROM 7-9 AM & 4-6 PM.



ADVANCED SIGNING SCHEMATIC

N.T.S.

LEGEND:



CITY OF NEWTON
MASSACHUSETTS
TEMPORARY TRAFFIC CONTROL PLANS - 1 OF 4
FOR THE
IMPROVEMENTS
AT
PETTEE SQUARE
OAK STREET AT CHESTNUT STREET

LEGEND:

- REFLECTORIZED PLASTIC DRUM OR 36" CONE
 - P/F POLICE/FLAGGER DETAIL
 - TYPE III BARRICADE
 - CHANGEABLE MESSAGE SIGN
 - ARROW BOARD
- WORK ZONE
 - DIRECTION OF TRAFFIC
 - IMPACT ATTENUATOR
 - TEMPORARY BARRIER (TL-2)
 - MEDIAN BARRIER WITH WARNING LIGHTS
- WORK VEHICLE
 - TRUCK MOUNTED ATTENUATOR
 - TRAFFIC OR PEDESTRIAN SIGNAL
 - SIGN

SUGGESTED WORK ZONE WARNING SIGN SPACING

ROAD TYPE	DISTANCE BETWEEN SIGNS (FEET)		
	A	B	C
LOCAL OR LOW VOLUME ROADWAYS	350	350	350
MOST OTHER ROADWAYS	500	500	500
FREEWAYS AND EXPRESSWAYS	1,000	1,500	2,640

* ROAD TYPE TO BE DETERMINED BY MASSDOT OFFICE OF TRANSPORTATION PLANNING.

** DISTANCES ARE SHOWN IN FEET. THE COLUMN HEADINGS A, B, AND C ARE THE DIMENSIONS SHOWN IN THE DETAIL/ TYPICAL SETUP FIGURES. THE A DIMENSION IS THE DISTANCE FROM THE TRANSITION OR POINT OF RESTRICTION TO THE FIRST SIGN. THE B DIMENSION IS THE DISTANCE BETWEEN THE FIRST AND SECOND SIGNS. THE C DIMENSION IS THE DISTANCE BETWEEN THE SECOND AND THIRD SIGNS. (THE "THIRD" SIGN IS THE FIRST ONE TYPICALLY ENCOUNTERED BY A DRIVER APPROACHING A TEMPORARY TRAFFIC CONTROL (TTC) ZONE.)

THE "THIRD" SIGN ABOVE IS TYPICALLY REFERRED TO AS AN "ADVANCE WARNING" SIGN ON THE TTC/PC/SETUPS. THESE ADVANCE WARNING SIGNS ARE LOCATED PRIOR TO THE PROJECT LIMITS ON ALL APPROACHES (i.e. THE W20-1 SERIES (ROAD WORK XX FT) SIGNS), AND USUALLY REMAIN FOR THE DURATION OF THE PROJECT. ADDITIONAL SIGNS (i.e. "RIGHT LANE CLOSED 1 MILE" AND "LEFT LANE CLOSED 1 MILE") HAVE BEEN SHOWN IN SOME FIGURES AS EXAMPLES OF REINFORCEMENT SIGN PLACEMENT BUT ARE USED IN RARE OCCASIONS.

THE FIRST AND SECOND WARNING SIGNS ABOVE ARE REFERRED TO AS THE OPERATIONAL (DAY-TO-DAY) WORK ZONE SIGNS AND MAY BE MOVED DEPENDING ON WHERE THE SPECIFIC ROADWAY WORK FOR THAT DAY IS LOCATED.

R2-10g SIGNS SHALL BE PLACED BETWEEN THE SECOND AND THIRD SIGNS AS DESCRIBED ABOVE.

R2-10a, R2-10e, AND W20-1 SERIES SIGNS ARE TO BE INCLUDED ON ALL DETAILS/TYPICAL SETUPS.

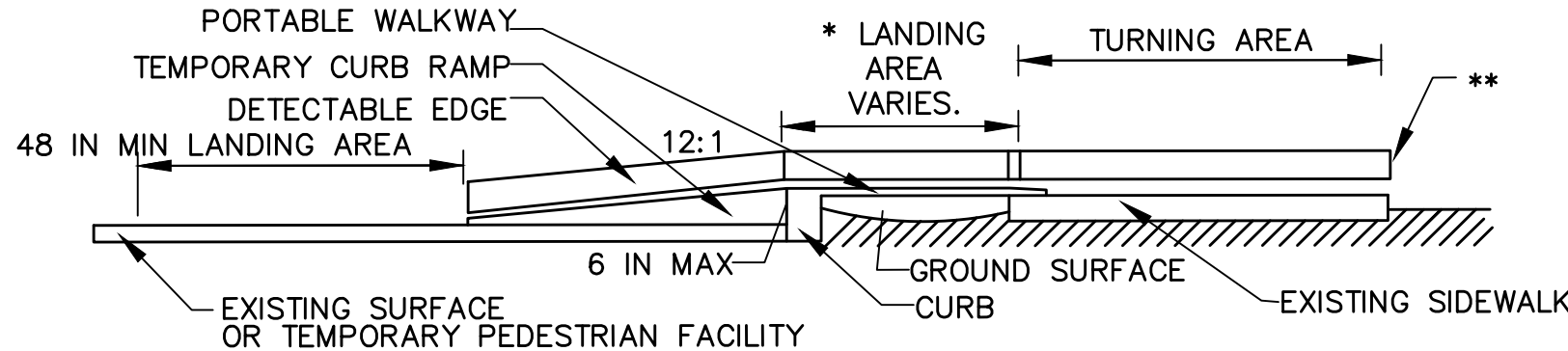
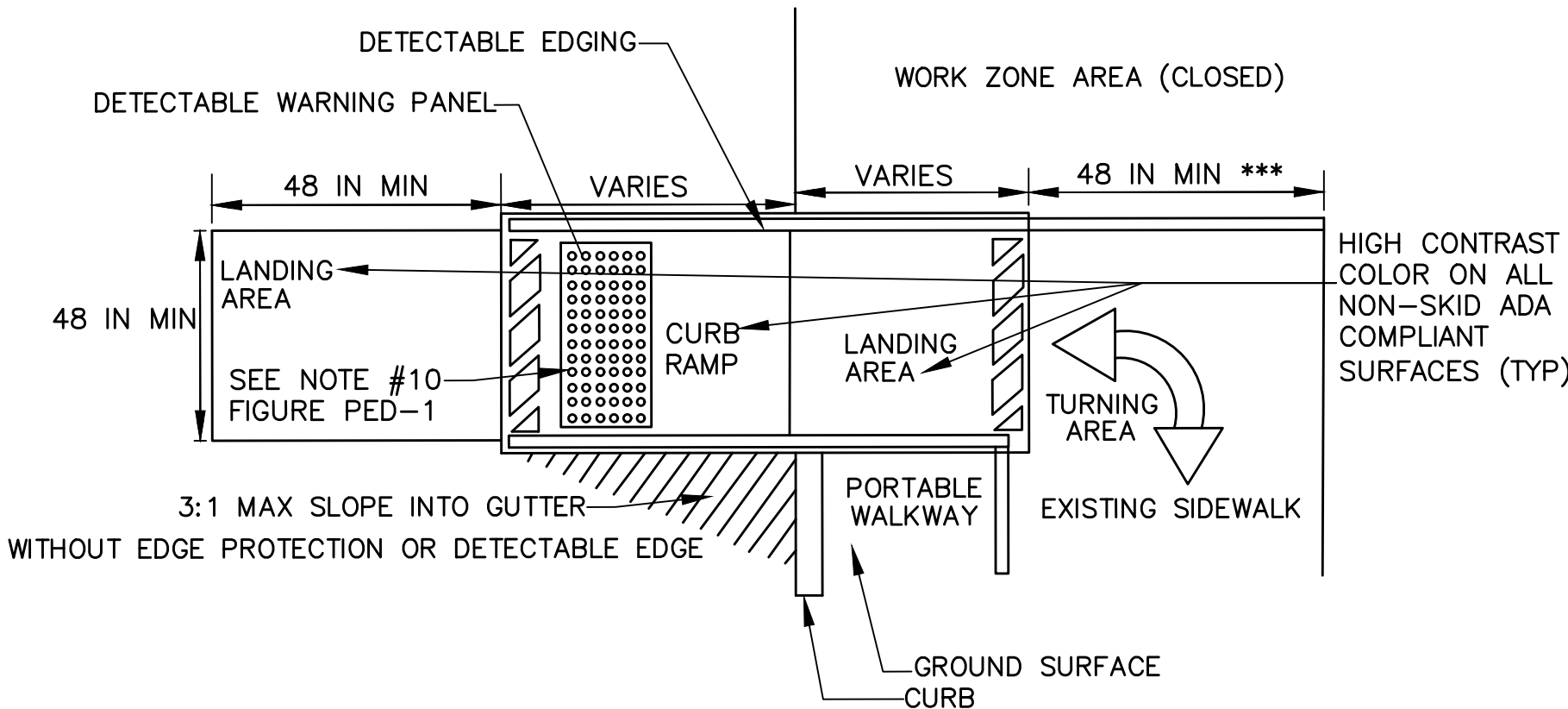
TAPER LENGTH CRITERIA FOR TEMPORARY TRAFFIC CONTROL ZONES

TYPE OF TAPER	TAPER LENGTH (L)
MERGING TAPER	AT LEAST L
SHIFTING TAPER	AT LEAST 0.5L
SHOULDER TAPER	AT LEAST 0.33L
ONE-LANE, TWO-WAY TRAFFIC TAPER	50 FT MIN. 100 FT MAX.
DOWNSTREAM TAPER	50 FT MIN. 100 FT MAX. PER LANE

FORMULAS FOR DETERMINING TAPER LENGTHS

SPEED LIMIT (S)	TAPER LENGTH (L) FEET
40 MPH OR LESS	$L = \frac{WS^2}{60}$
45 MPH OR MORE	$L = WS$

WHERE: L = TAPER LENGTH IN FEET
W = WIDTH OF OFFSET IN FEET
S = POSTED SPEED LIMIT, OR OFF-PEAK 85TH-PERCENTILE SPEED PRIOR TO WORK STARTING, OR THE ANTICIPATED OPERATING SPEED IN MPH



* -LANDING AREA USED TO OVERLAP NON-ADA COMPLIANT SURFACES.

** -DETECTABLE EDGE REMOVED IF A CONTINUOUS SIDEWALK.

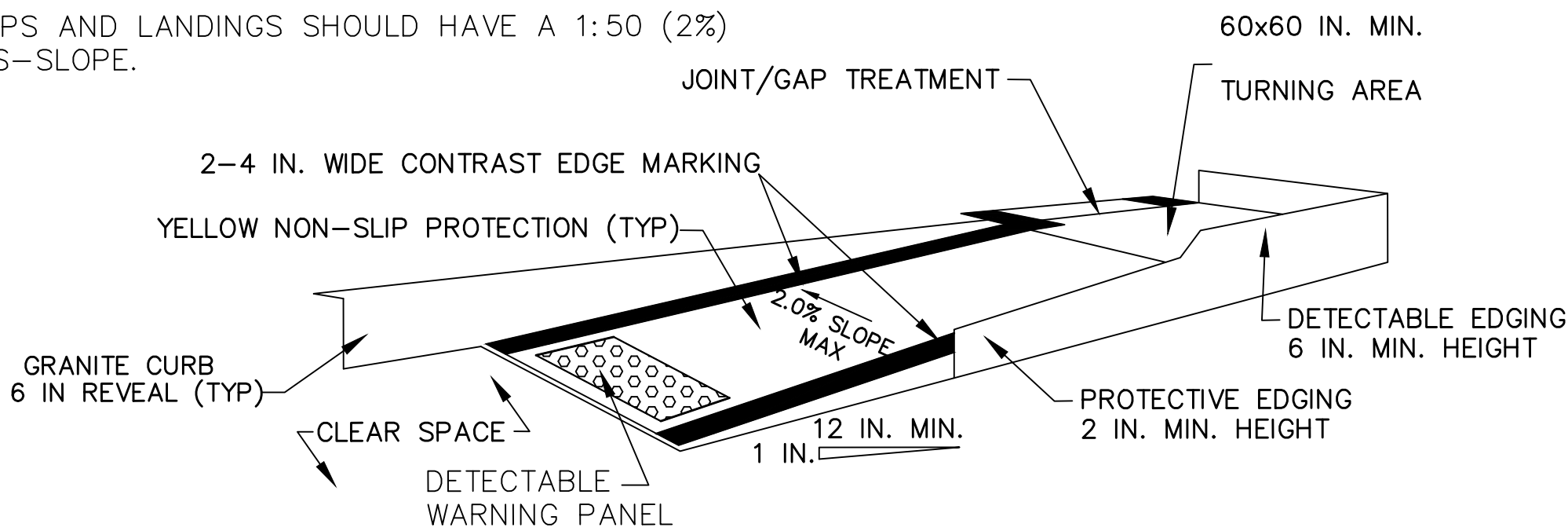
*** -60 IN. IF AN OBSTRUCTION IS AT BACK OF SIDEWALK

TEMPORARY CURB RAMP-TYPE 2

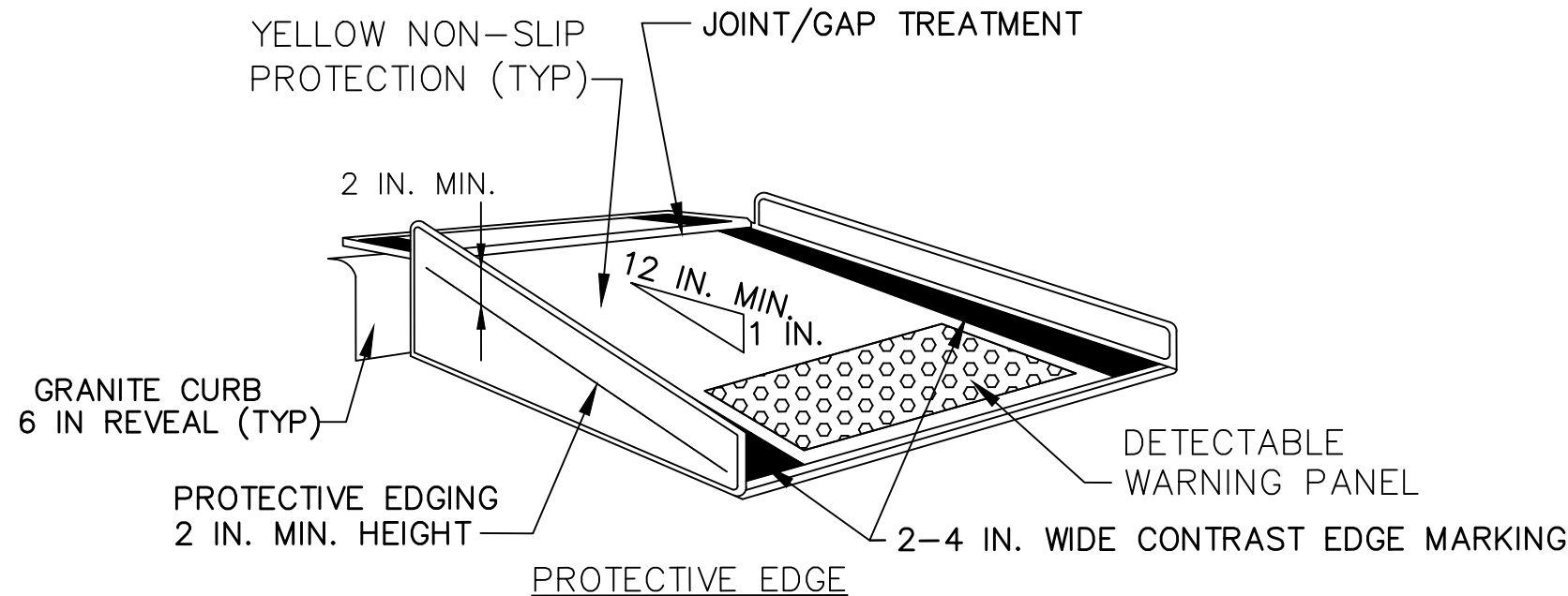
PEDESTRIAN TYPICAL DETAILS

NOTES:

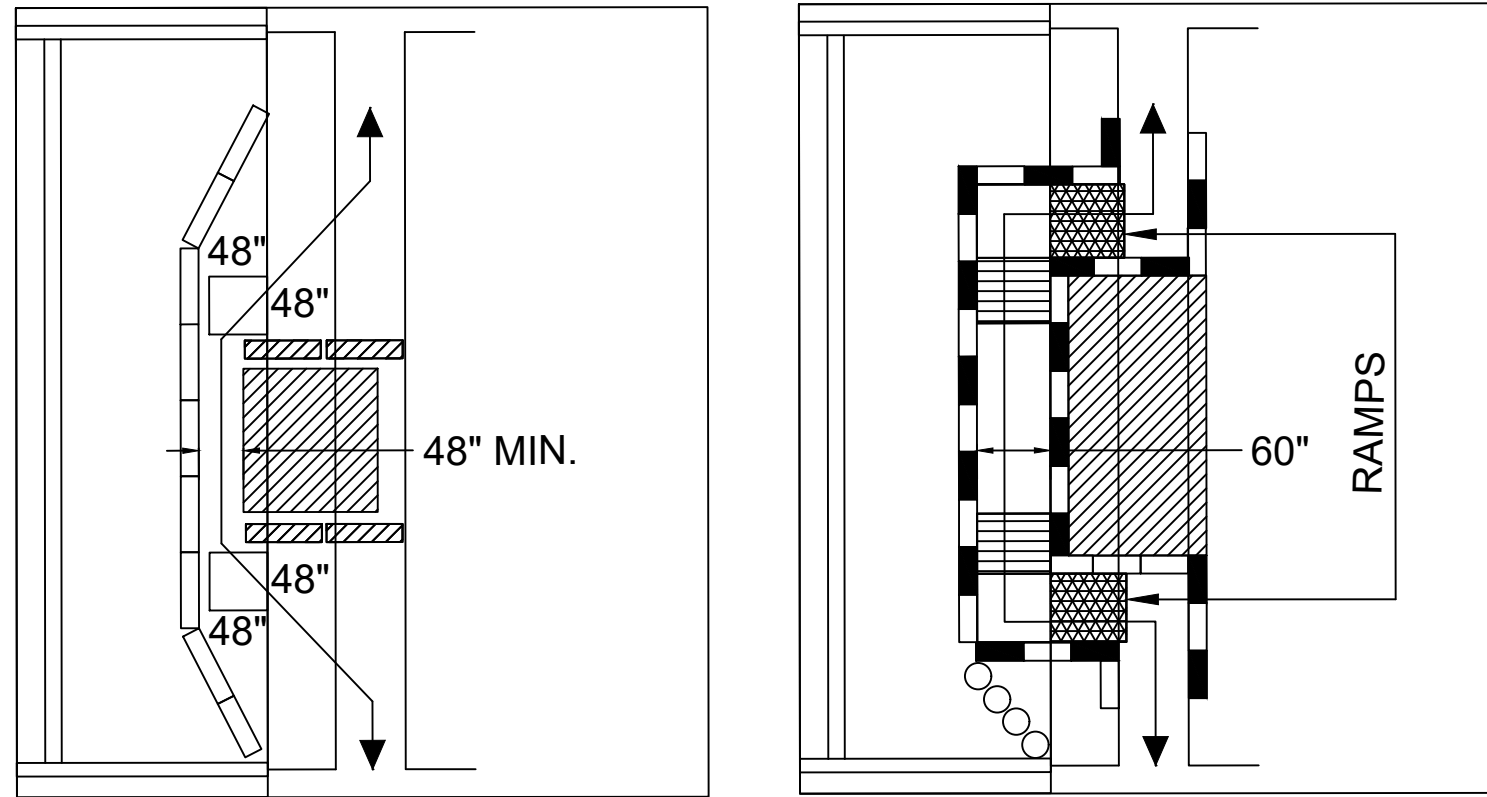
- CURB RAMPS SHALL BE 60 IN. MINIMUM WIDTH WITH A FIRM, STABLE AND NON-SLIP SURFACE.
- PROTECTIVE EDGING WITH A 2 IN. MINIMUM HEIGHT SHALL BE INSTALLED WHEN THE CURB RAMP OR LANDING PLATFORM HAS A VERTICAL DROP OF 6 IN. OR GREATER OR HAS A SIDE APRON SLOP STEEPER THAN 1:3 (33%). PROTECTIVE EDGING SHOULD BE CONSIDERED WHEN THE CURB RAMPS OR LANDING PLATFORMS HAVE A VERTICAL DROP OF 3 IN. OR MORE.
- DETECTABLE EDGING WITH 6 IN. MINIMUM HEIGHT AND CONTRASTING COLOR SHALL BE INSTALLED ON ALL CURB RAMP LANDINGS WHERE THE WALKWAY CHANGES DIRECTION (TURNS).
- THE CURB RAMP WALKWAY AND LANDING AREA SURFACE SHALL BE OF A SOLID CONTINUOUS CONTRASTING COLOR ABUTTING UP TO THE EXISTING SIDEWALK.
- CURB RAMPS AND LANDINGS SHOULD HAVE A 1:50 (2%) MAX CROSS-SLOPE.
- CLEAR SPACE OF 48x48 IN. MINIMUM SHALL BE PROVIDED ABOVE AND BELOW THE CURB RAMP.
- WATER FLOW IN THE GUTTER SYSTEM SHALL HAVE MINIMAL RESTRICTION.
- LATERAL JOINTS OR GAPS BETWEEN SURFACES SHALL BE LESS THAN 0.5 IN. WIDTH.
- CHANGES BETWEEN SURFACE HEIGHTS SHOULD NOT EXCEED 0.5 IN. LATERAL EDGES SHOULD BE VERTICAL UP TO 0.25 IN. HIGH, AND BEVELED AT 1:2 BETWEEN 0.25 IN. AND 0.5 IN. HEIGHT.
- IF A TEMPORARY PEDESTRIAN RAMP LEADS TO A CROSSWALK, THEN A DETECTABLE WARNING PAD MUST BE ADHERED TO THE BASE OF THE RAMP. IF IT LEADS TO A PROTECTED PEDESTRIAN BYPASS THAT DOES NOT CONFLICT WITH VEHICULAR TRAFFIC, THEN A PAD SHALL NOT BE INSTALLED ON THE RAMP.



TEMPORARY CURB RAMP-PARALLEL TO CURB



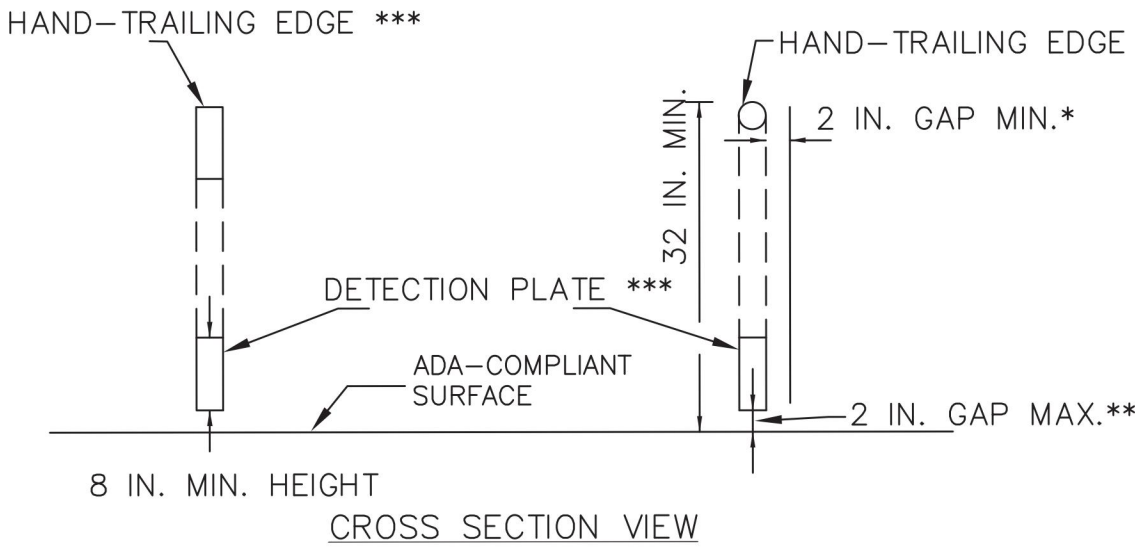
TEMPORARY CURB RAMP-PERPENDICULAR TO CURB



- WHEN EXISTING PEDESTRIAN FACILITIES ARE DISRUPTED, CLOSED, OR RELOCATED IN A TTC ZONE, TEMPORARY FACILITIES SHALL BE PROVIDED AND THEY SHALL BE DETECTABLE AND INCLUDE ACCESSIBILITY FEATURES CONSISTENT WITH THE FEATURES PRESENT IN THE EXISTING PEDESTRIAN FACILITY.
- A PEDESTRIAN CHANNELIZING DEVICE THAT IS DETECTABLE BY A PERSON WITH A VISUAL DISABILITY TRAVELING WITH THE AID OF A LONG CANE SHALL BE PLACED ACROSS THE FULL WIDTH OF THE CLOSED SIDEWALK.
- WHEN USED, TEMPORARY RAMPS SHALL COMPLY WITH AMERICANS WITH DISABILITIES ACT (SEE FIGURES PED-1 & PED-2).
- THE ALTERNATE PATHWAY SHOULD HAVE A SMOOTH CONTINUOUS HARD SURFACE FOR THE ENTIRE LENGTH OF THE TEMPORARY PEDESTRIAN FACILITY.
- THE PROTECTIVE REQUIREMENTS OF A TTC SITUATION HAVE PRIORITY IN DETERMINING THE NEED FOR TEMPORARY TRAFFIC BARRIERS AND THEIR USE IN THIS SITUATION SHOULD BE BASED ON ENGINEERING JUDGMENT.
- AUDIBLE INFORMATION DEVICES SHOULD BE CONSIDERED WHERE MIDBLOCK CLOSINGS AND CHANGED CROSSWALK AREAS CAUSE INADEQUATE COMMUNICATION TO BE PROVIDED TO PEDESTRIANS WHO HAVE VISUAL DISABILITIES.

AUDIBLE DEVICES

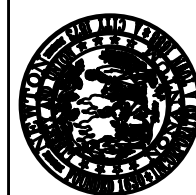
FOR LONG TERM SIDEWALK CLOSURES (AT A MINIMUM OVERNIGHT) A FORM OF SPEECH MESSAGING FOR PEDESTRIANS WITH VISUAL DISABILITIES SHALL BE PROVIDED. AUDIBLE INFORMATION DEVICES SUCH AS DETECTABLE BARRIERS OR BARRICADES AND OTHER PASSIVE PEDESTRIAN ACTIVATION (MOTION ACTIVATED) DEVICES SHOULD BE CONSIDERED FOR THESE CASES. THESE AUDIBLE DEVICES CAN BE MOUNTABLE OR STAND ALONE.



PEDESTRIAN CHANNELIZING DEVICE

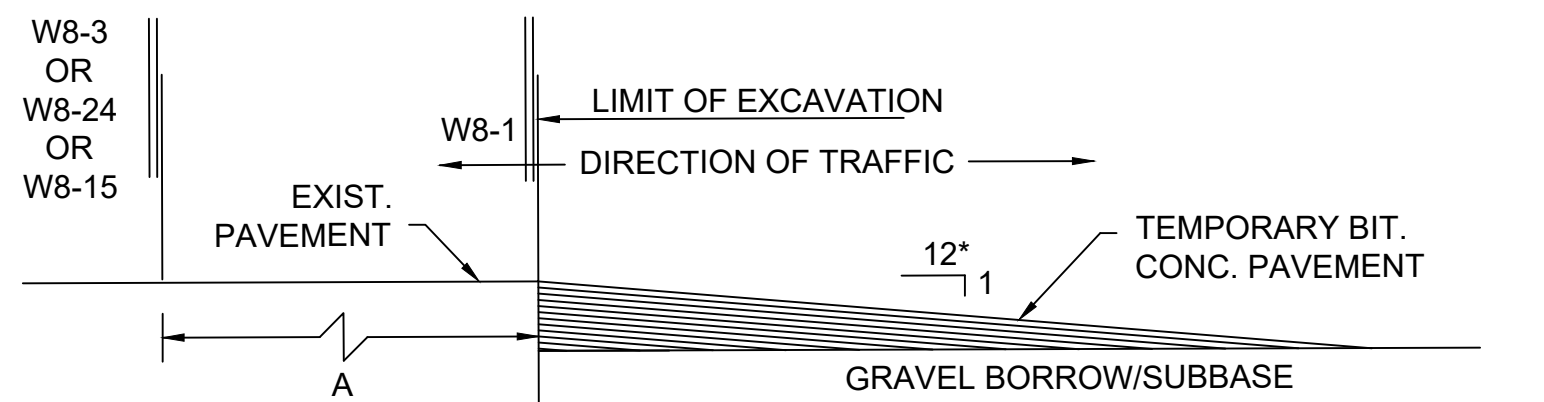
NOTES:

- * THERE SHALL BE A 2 INCH GAP BETWEEN THE HAND-TRAILING EDGE AND ITS SUPPORT.
- ** A MAXIMUM 2 INCH GAP BETWEEN THE BOTTOM OF THE BOTTOM RAIL AND THE SURFACE MAY BE USED TO PROVIDE DRAINAGE.
- *** THE HAND-TRAILING EDGE AND DETECTION PLATE SHALL BE CONTINUOUS THROUGHOUT THE LENGTH OF THE PATH SUCH THAT A PEDESTRIAN USER WITH A LONG CANE CAN FOLLOW IT.

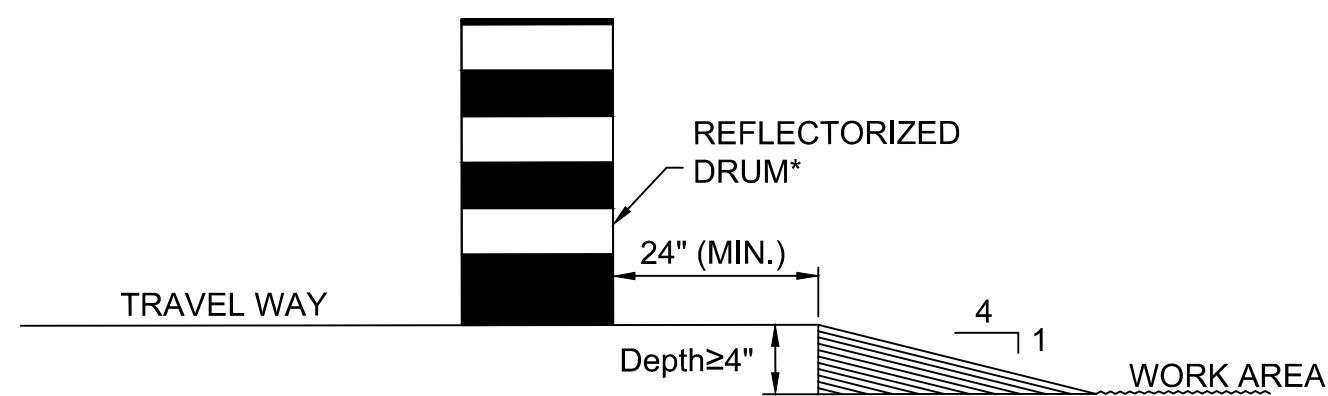


CITY OF NEWTON
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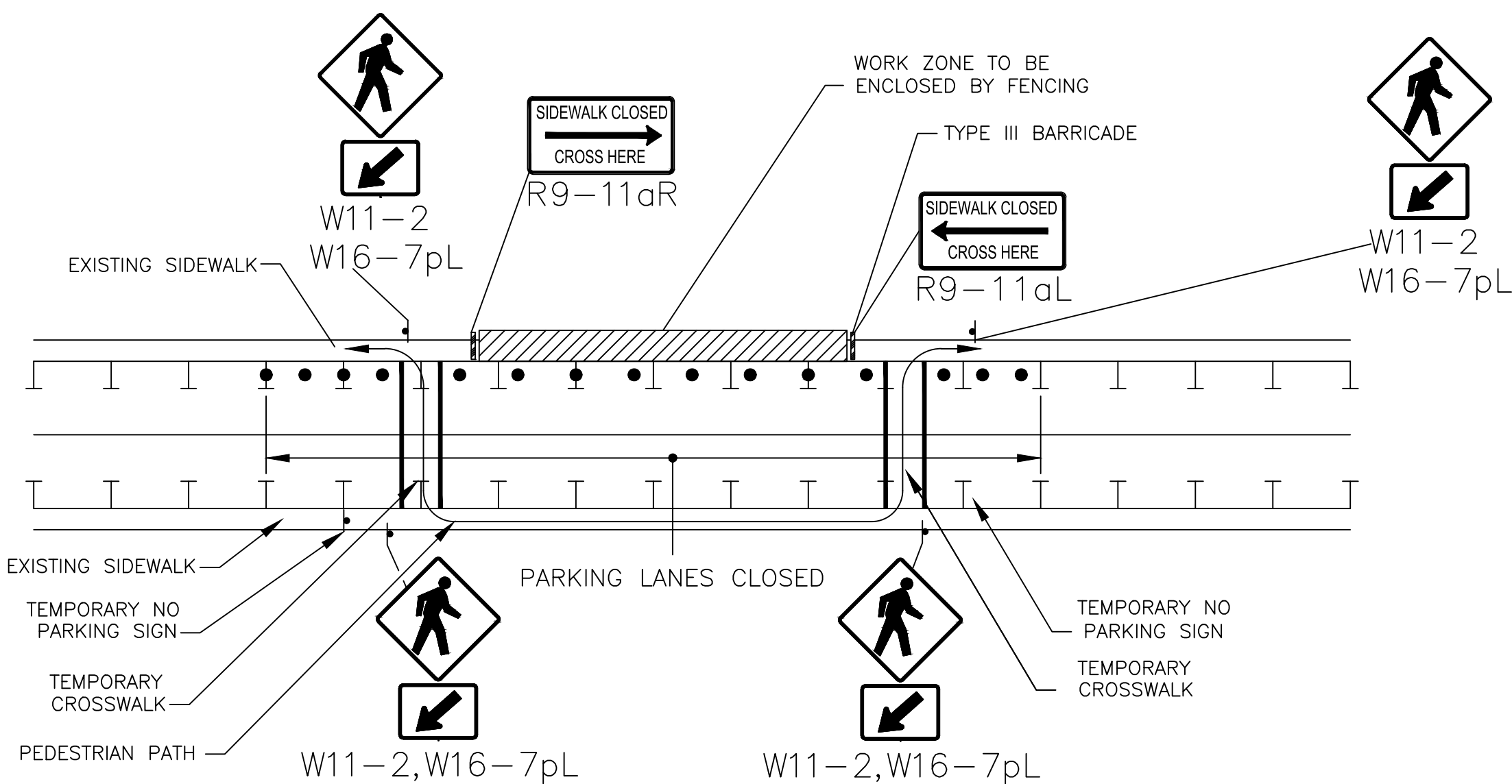
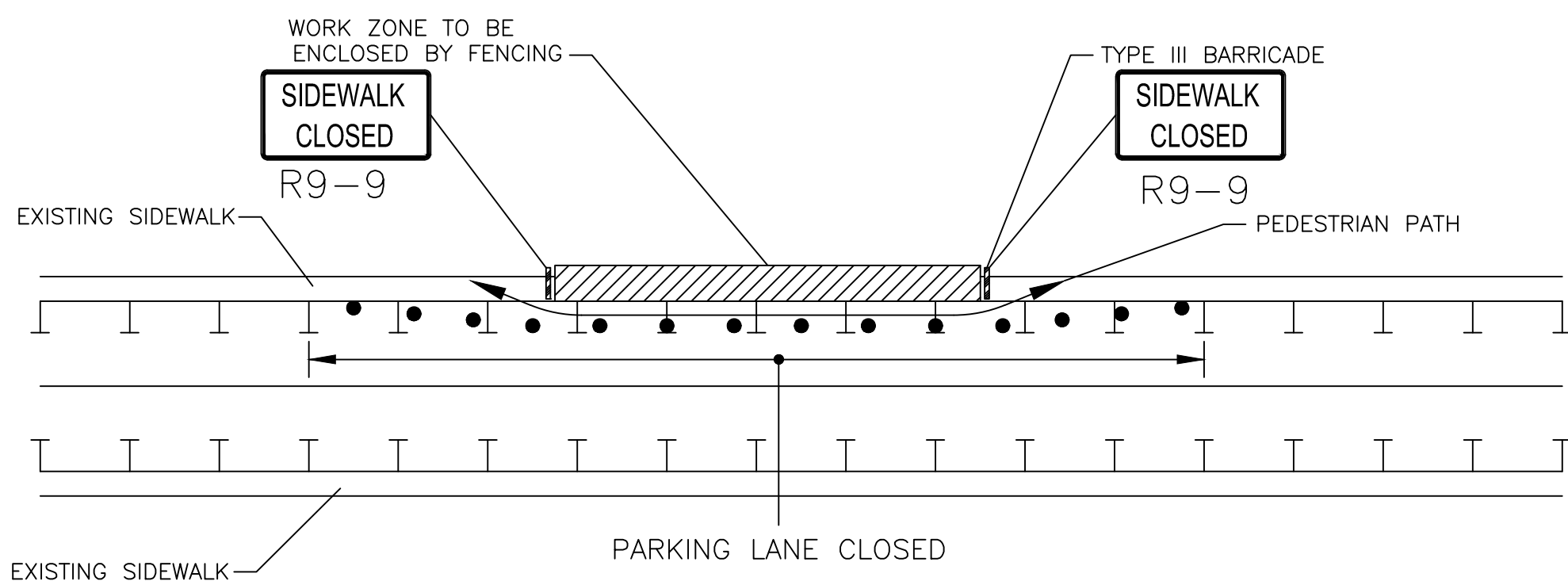
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APPROVED BY: LSA



LONGITUDINAL DROP-OFF DETAIL
NOT TO SCALE

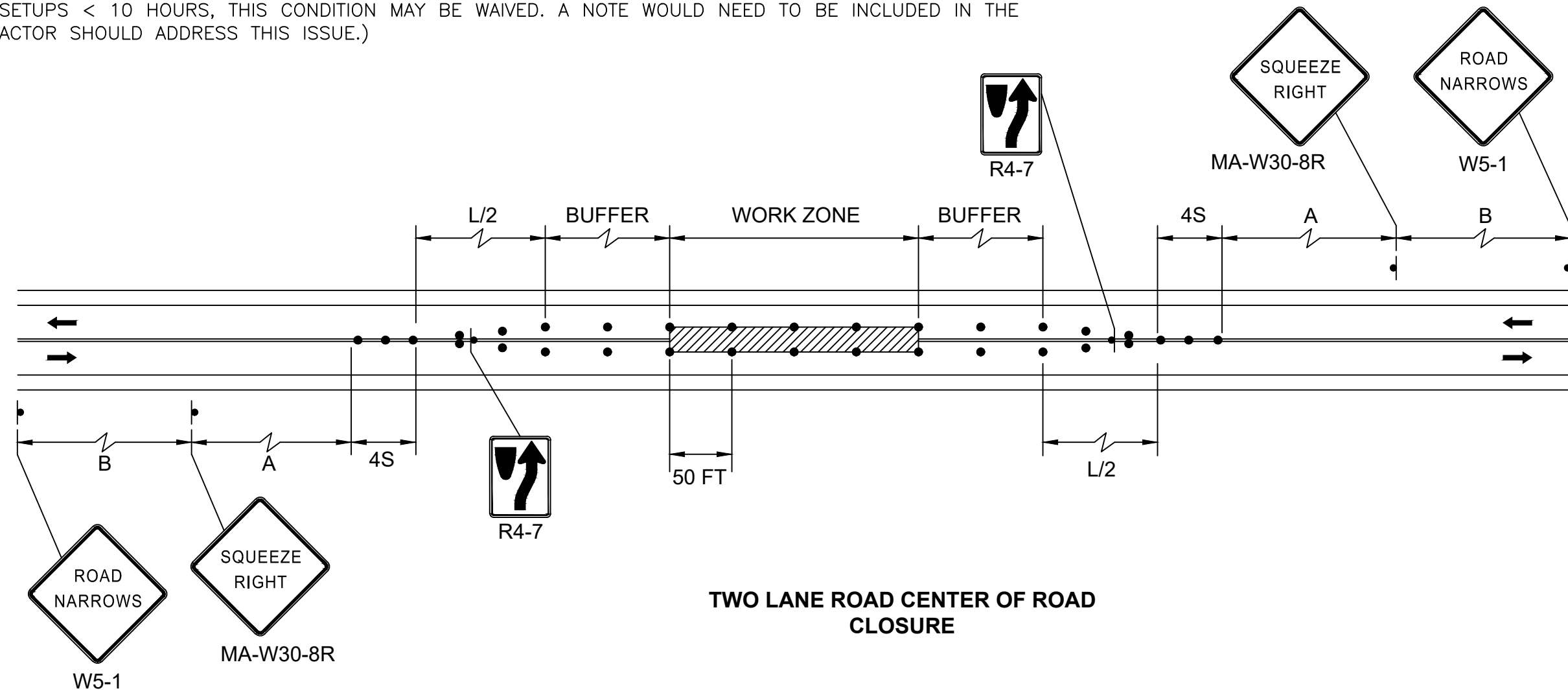


LATERAL DROP-OFF DETAIL
NOT TO SCALE

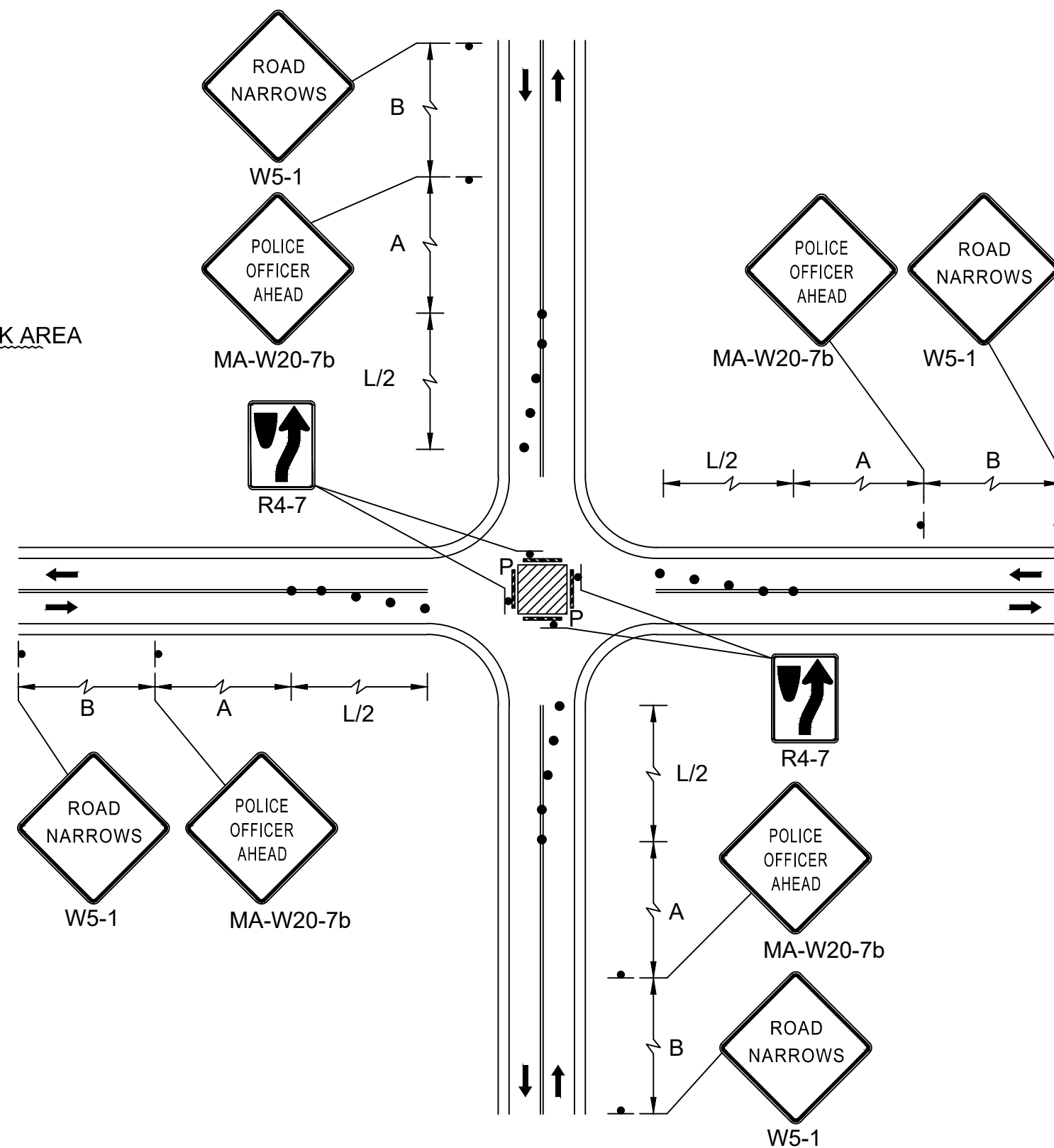


NOTES

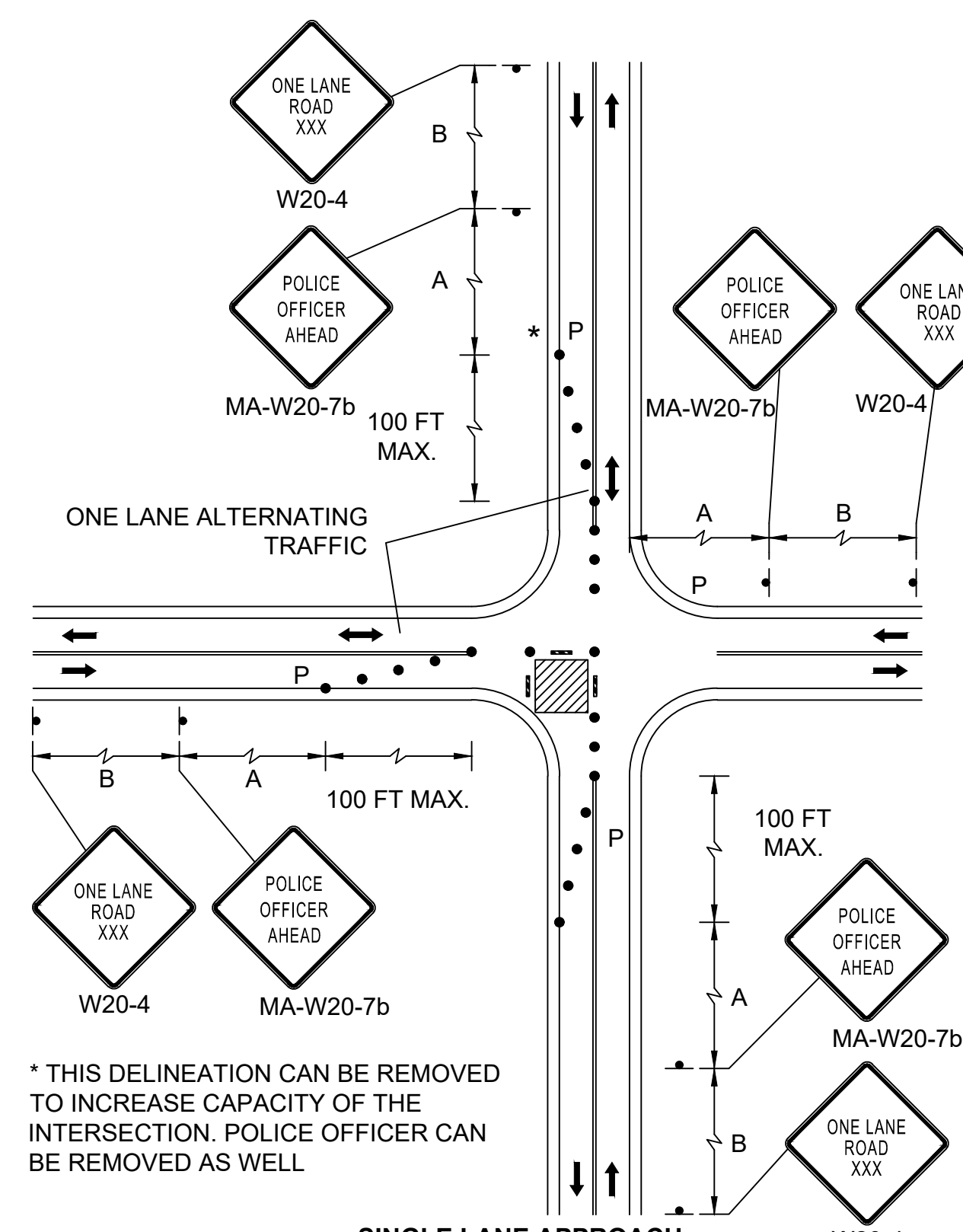
1. ADDITIONAL ADVANCE WARNING MAY BE NECESSARY.
2. CONTROLS ONLY FOR PEDESTRIAN TRAFFIC ARE SHOWN. VEHICULAR TRAFFIC SHOULD BE HANDLED AS SHOWN ELSEWHERE.
3. STREET LIGHTING SHOULD BE CONSIDERED WHEN LOCATING CONTROL DEVICES.
4. IF THE WORK ZONE DOES NOT PERMIT PEDESTRIANS TO TRAVEL ADJACENT TO IT AS SHOWN IN PEDESTRIAN BYPASS TYPE I, TEMPORARY CROSSWALKS WITH APPROPRIATE SIGNS SHOULD BE INSTALLED TO CROSS PEDESTRIANS TO THE OPPOSITE SIDE OF THE STREET AS SHOWN IN PEDESTRIAN BYPASS TYPE II, AND AS DIRECTED BY THE ENGINEER. TEMPORARY CURB RAMPs WILL BE REQUIRED AT ALL TEMPORARY CROSSWALK LOCATIONS.
5. BYPASS IS TO BE USED IN CONJUNCTION WITH THE PROPOSED LANE CLOSURE DETAILS AND DURING CONSTRUCTION STAGING, AS DIRECTED BY THE ENGINEER.
6. THE TEMPORARY SIDEWALK SHOULD BE A MINIMUM OF 4 FEET WIDE. IF THIS WALKWAY EXCEEDS 200 FEET THEN A 5 FOOT X 5 FOOT PASSING ZONE. (FOR SHORT TERM SETUPS < 10 HOURS, THIS CONDITION MAY BE WAIVED. A NOTE WOULD NEED TO BE INCLUDED IN THE TFCP THAT STATES HOW THE CONTRACTOR SHOULD ADDRESS THIS ISSUE.)



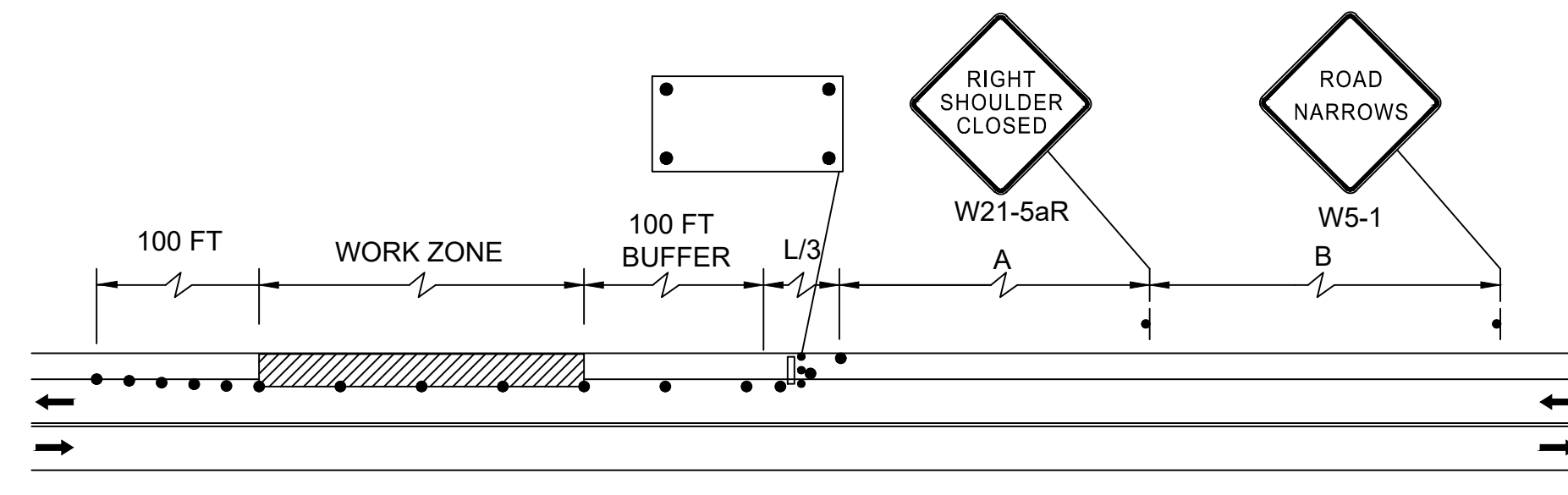
TWO LANE ROAD CENTER OF ROAD CLOSURE



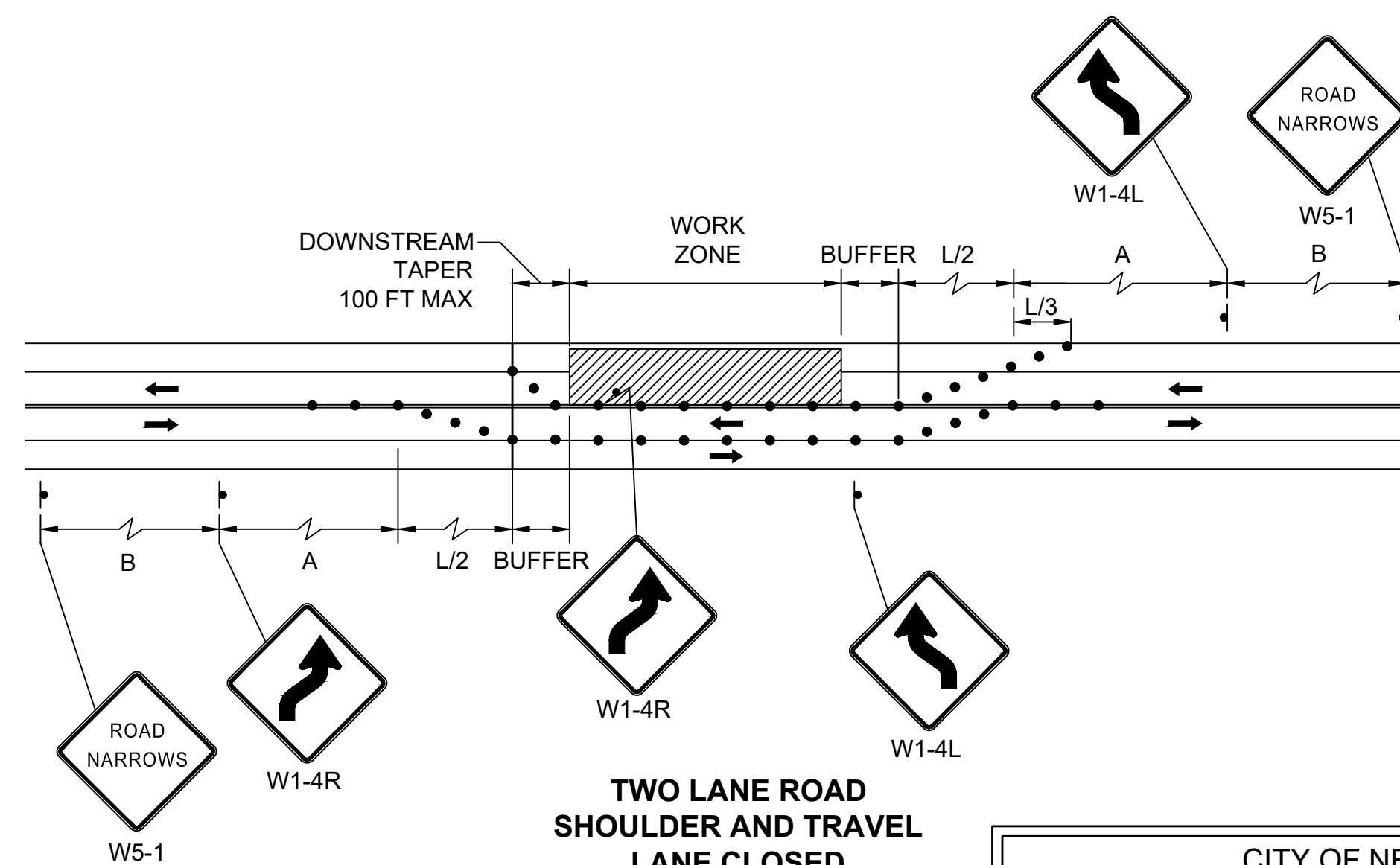
SINGLE LANE APPROACH CENTER CLOSURE



SINGLE LANE APPROACH ONE QUADRANT CLOSURE

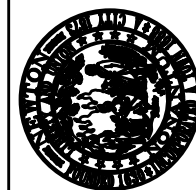


TWO LANE ROAD SHOULDER CLOSED



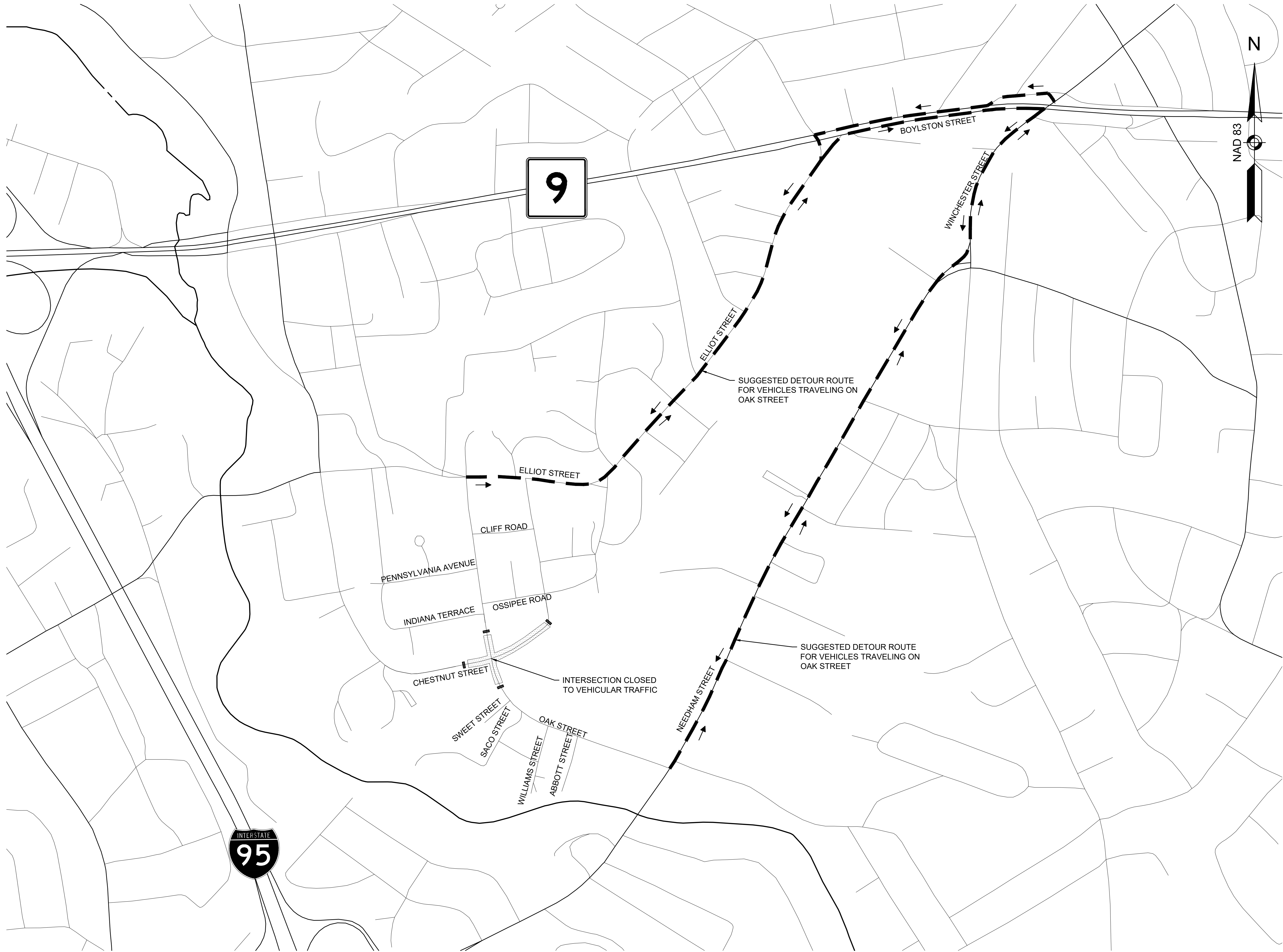
TWO LANE ROAD SHOULDER AND TRAVEL LANE CLOSED

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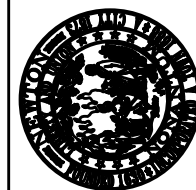
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MASSACHUSETTS

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OAK STREET AT CHESTNUT STREET SUGGESTED DETOUR ROUTE
N.T.S.

CITY OF NEWTON
MASSACHUSETTS
TEMPORARY TRAFFIC CONTROL PLANS - 4 OF 4
FOR THE
IMPROVEMENTS
AT
PETTEE SQUARE
OAK STREET AT CHESTNUT STREET

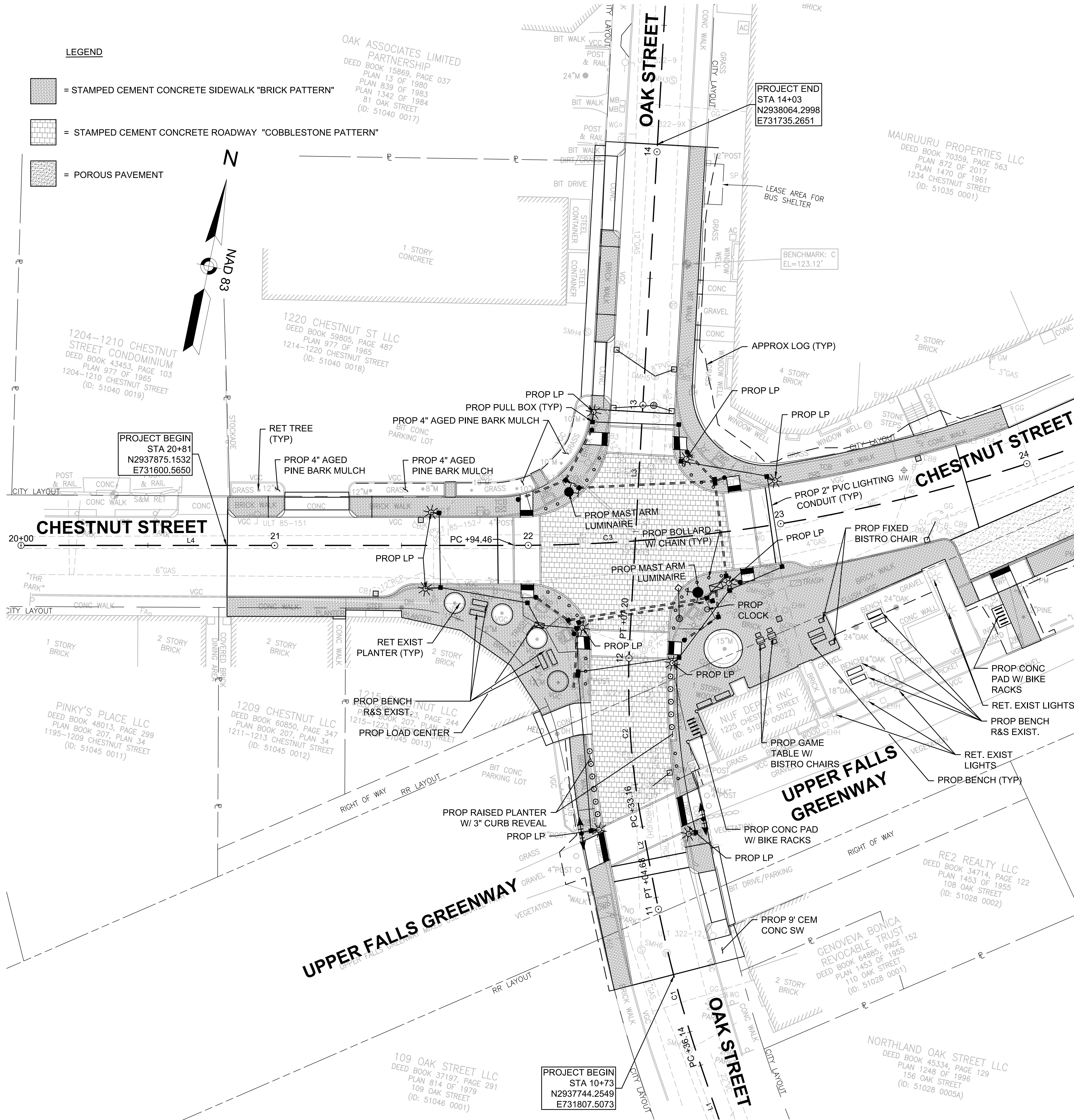


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LEGEND

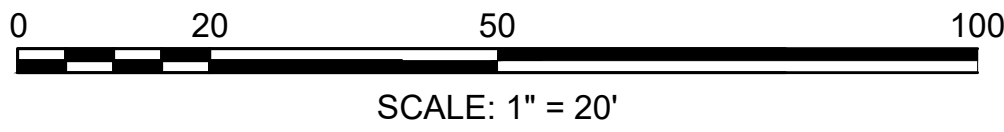
- = STAMPED CEMENT CONCRETE SIDEWALK "BRICK PATTERN"
- = STAMPED CEMENT CONCRETE ROADWAY "COBBLESTONE PATTERN"
- = POROUS PAVEMENT



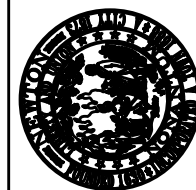
- NOTES:
- SEE LANDSCAPE & LIGHTING DETAILS FOR LIGHT POLE DETAILS AND BENCH OPTIONS

PROPOSED PLANTING TABLE					
SYMBOL	QTY	BOTANICAL NAME	COMMON NAME	SIZE	COMMENTS
	6	LIRIOPE SPICATA	CREeping LILY TURF	4" POT	5' O.C.
	5	PACHYSANDRA PROCUMBENS	ALLEGHENY SPURGE	4" POT	5' O.C.

- PLANTING NOTES:
- CONTRACTOR SHALL HAVE ALL SUBSURFACE UTILITIES MARKED PRIOR TO THE START OF WORK.
 - FINAL LOCATION OF ALL PLANT MATERIAL SHALL BE REVIEWED AND BE APPROVED BY THE CITY PRIOR TO PLANTING.
 - ALL PLANT MATERIAL SHALL HAVE TAGS INDICATING COMMON NAME, BOTANICAL NAME & SIZE.
 - ALL PLANTS SHALL BE MULCHED PER THE PLANTING SPECIFICATIONS AND DETAILS.
 - ALL DISTURBED AREAS SHALL BE LOAMED AND SEEDED UNLESS NOTED OTHERWISE.



CITY OF NEWTON
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LANDSCAPE & LIGHTING PLANS - 1 OF 2
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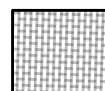


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MAURUURU PROPERTIES LLC
DEED BOOK 70359, PAGE 563
PLAN 872 OF 2017
PLAN 1470 OF 2017
1234 CHESTNUT STREET
(D: 51035 0001)

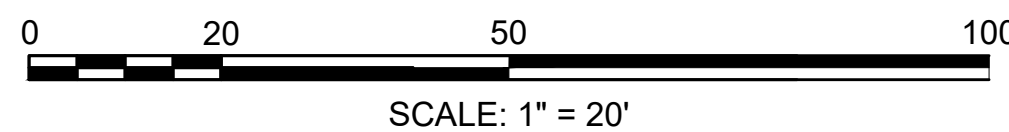
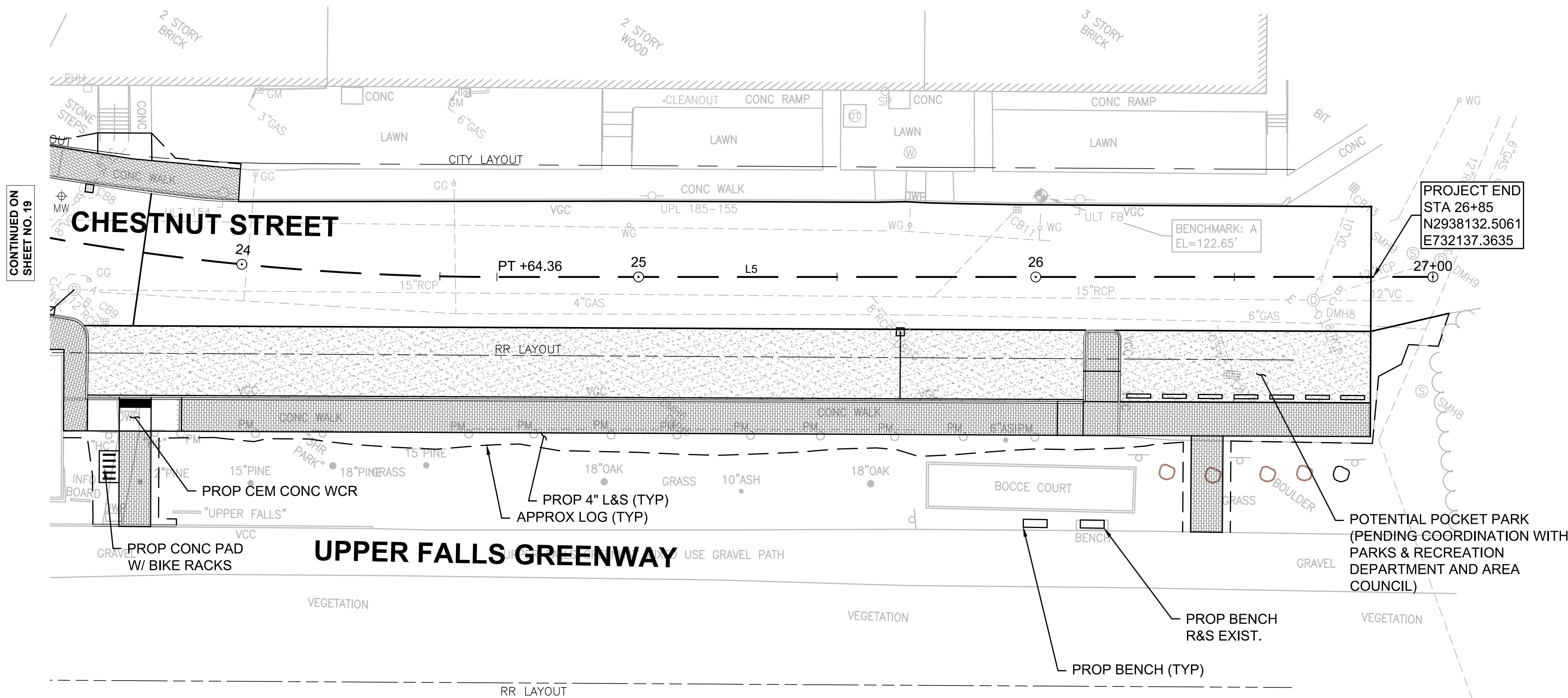
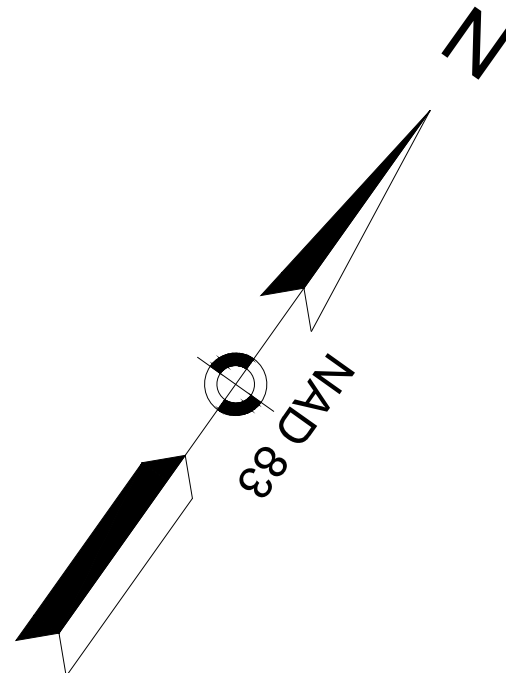
LEGEND



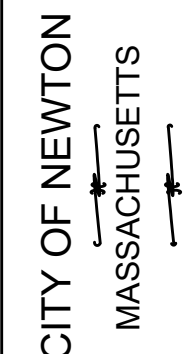
= STAMPED CEMENT CONCRETE SIDEWALK "BRICK PATTERN"



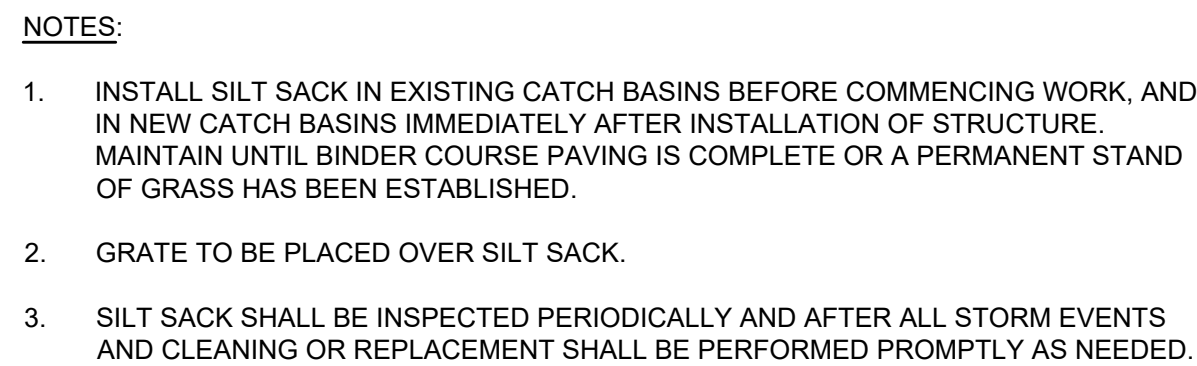
= POROUS PAVEMENT



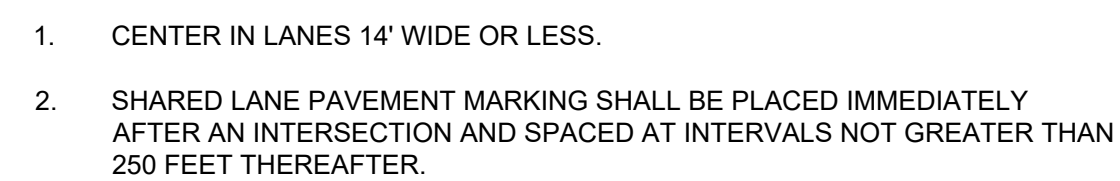
CITY OF NEWTON
MASSACHUSETTS
LANDSCAPE & LIGHTING PLANS - 2 OF 2
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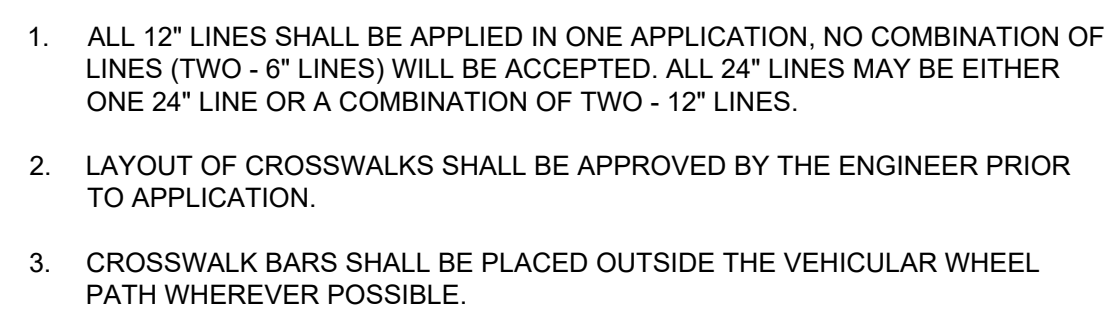
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CITY OF NEWTON
MASSACHUSETTS
CONSTRUCTION DETAILS - 1 OF 2
FOR THE
IMPROVEMENTS
AT
PETTEE SQUARE
OAK STREET AT CHESTNUT STREET



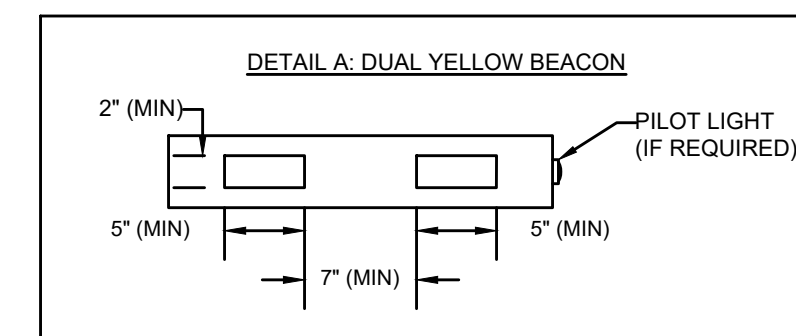
SHARED LANE PAVEMENT MARKING
N.T.S.



CROSSWALK PAVEMENT MARKING
N.T.S.



- PLUS ALL MOUNTING AND SUPPORTING HARDWARE AND
WIRING NECESSARY TO COMPLETE A WORKING SYSTEM.



1. ALL DIMENSIONS TO EDGE OF 4" PAVEMENT STRIPING.
2. ALL STRIPING SHALL BE 4" WIDE SOLID WHITE PAVEMENT MARKINGS UNLESS OTHERWISE NOTED.
3. 8' CLEAR WIDTH REFERS TO 8' BETWEEN INSIDE EDGES OF PAVEMENT MARKINGS.
4. SYMBOL SHALL BE CENTERED WITHIN PARKING STALL

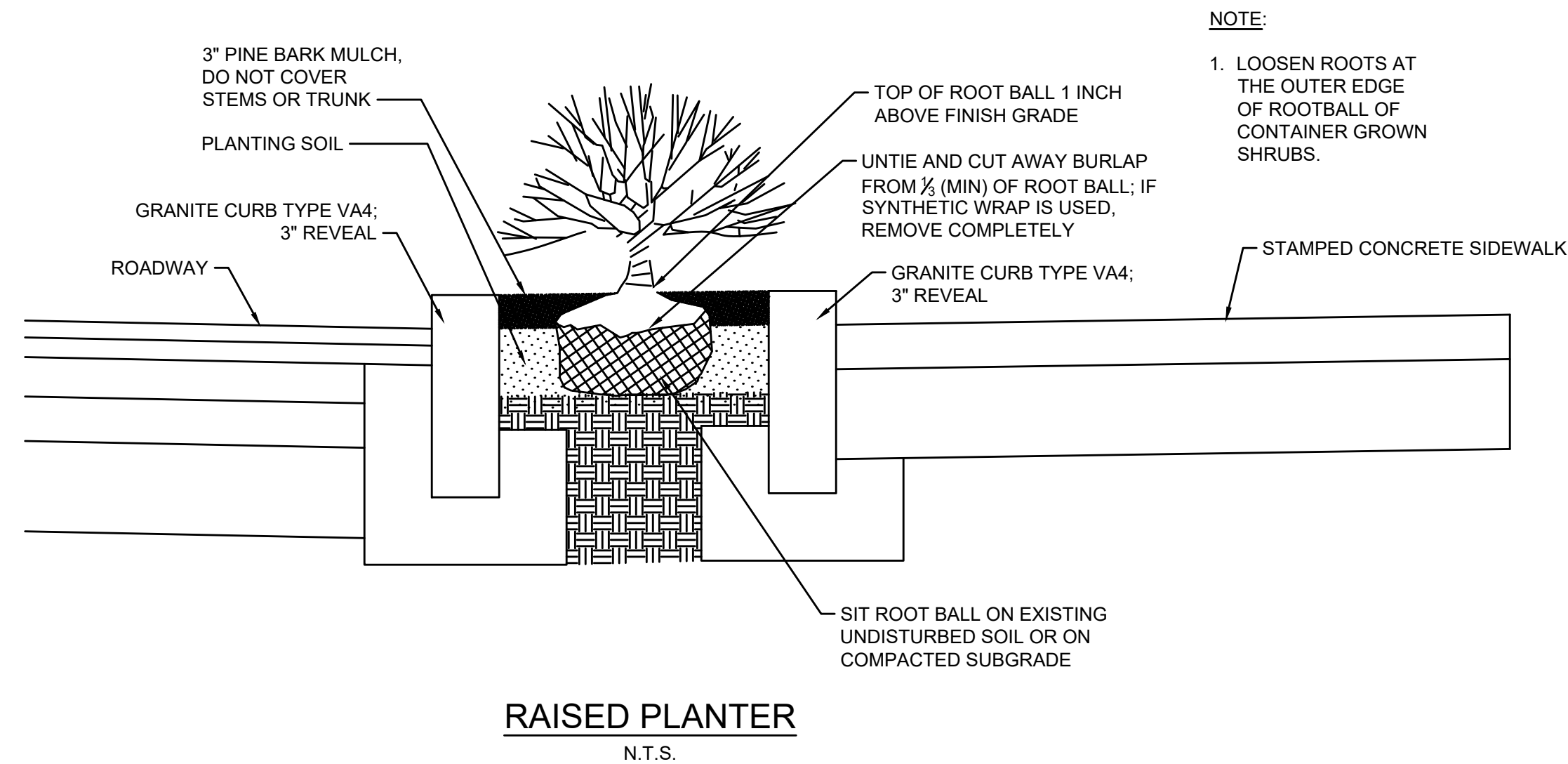


CITY OF NEWTON
MASSACHUSETTS
CONSTRUCTION DETAILS- 2 OF 2
FOR THE
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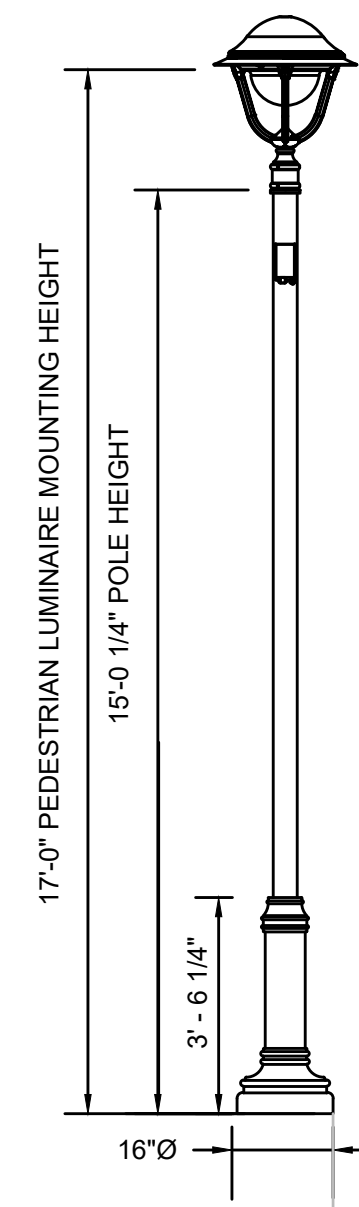
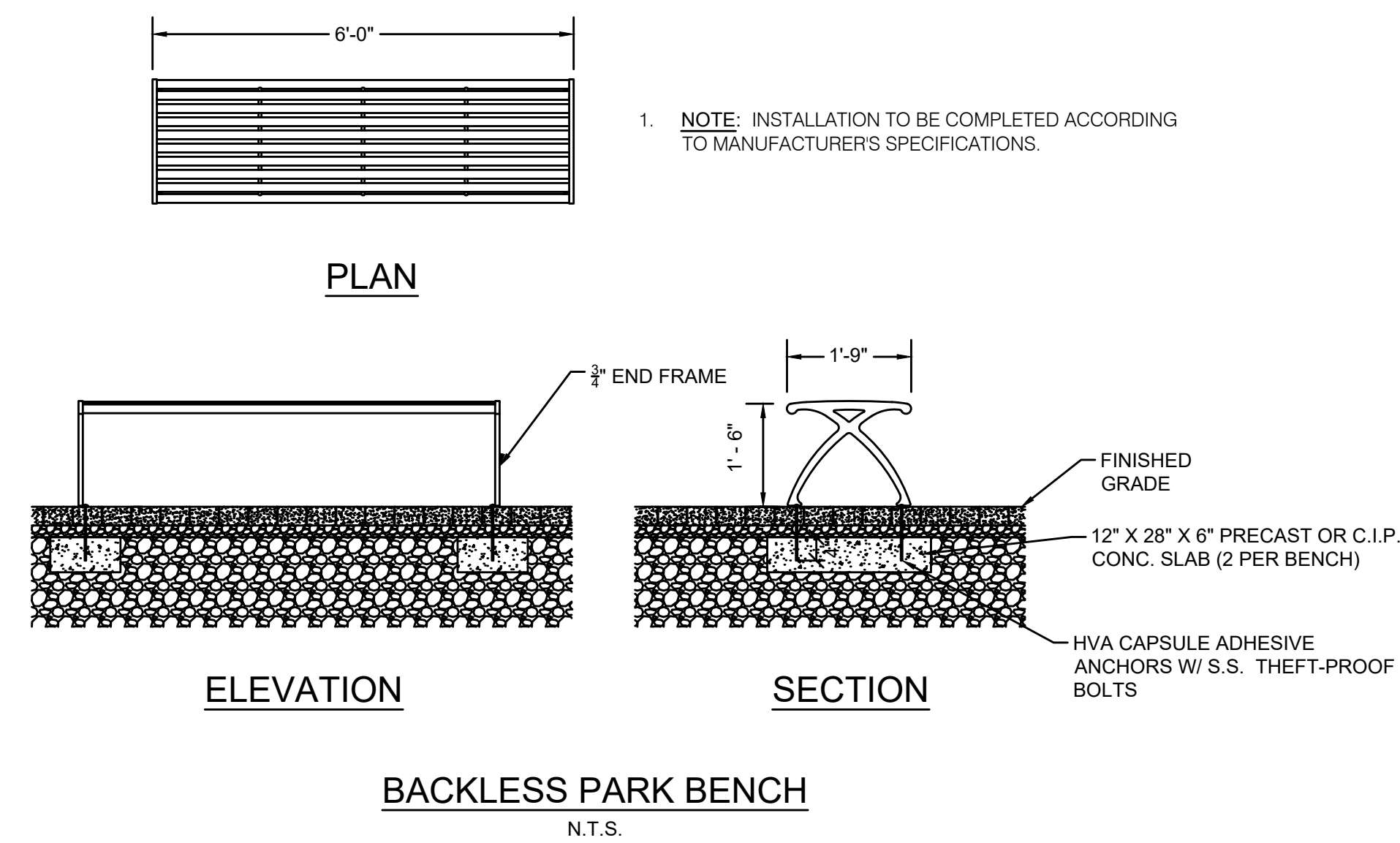
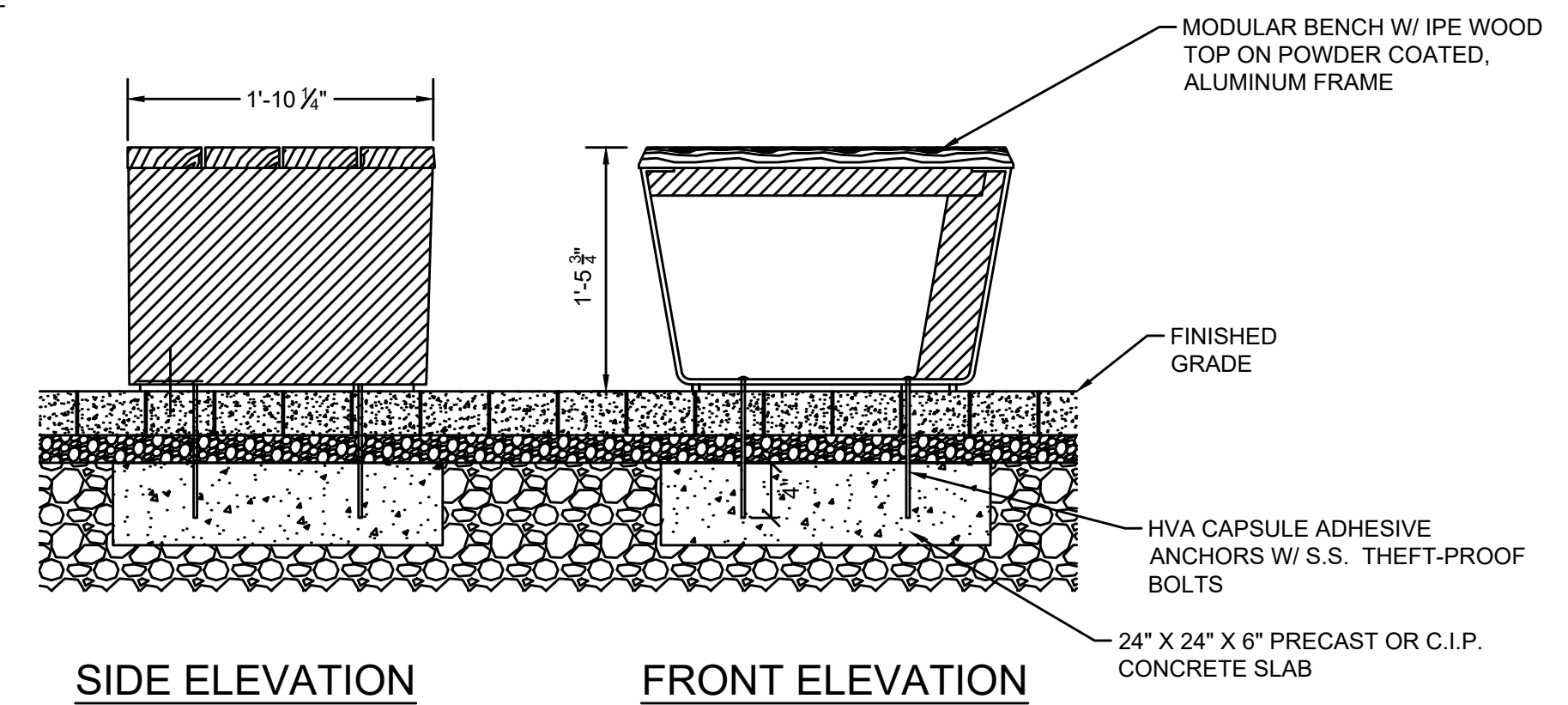
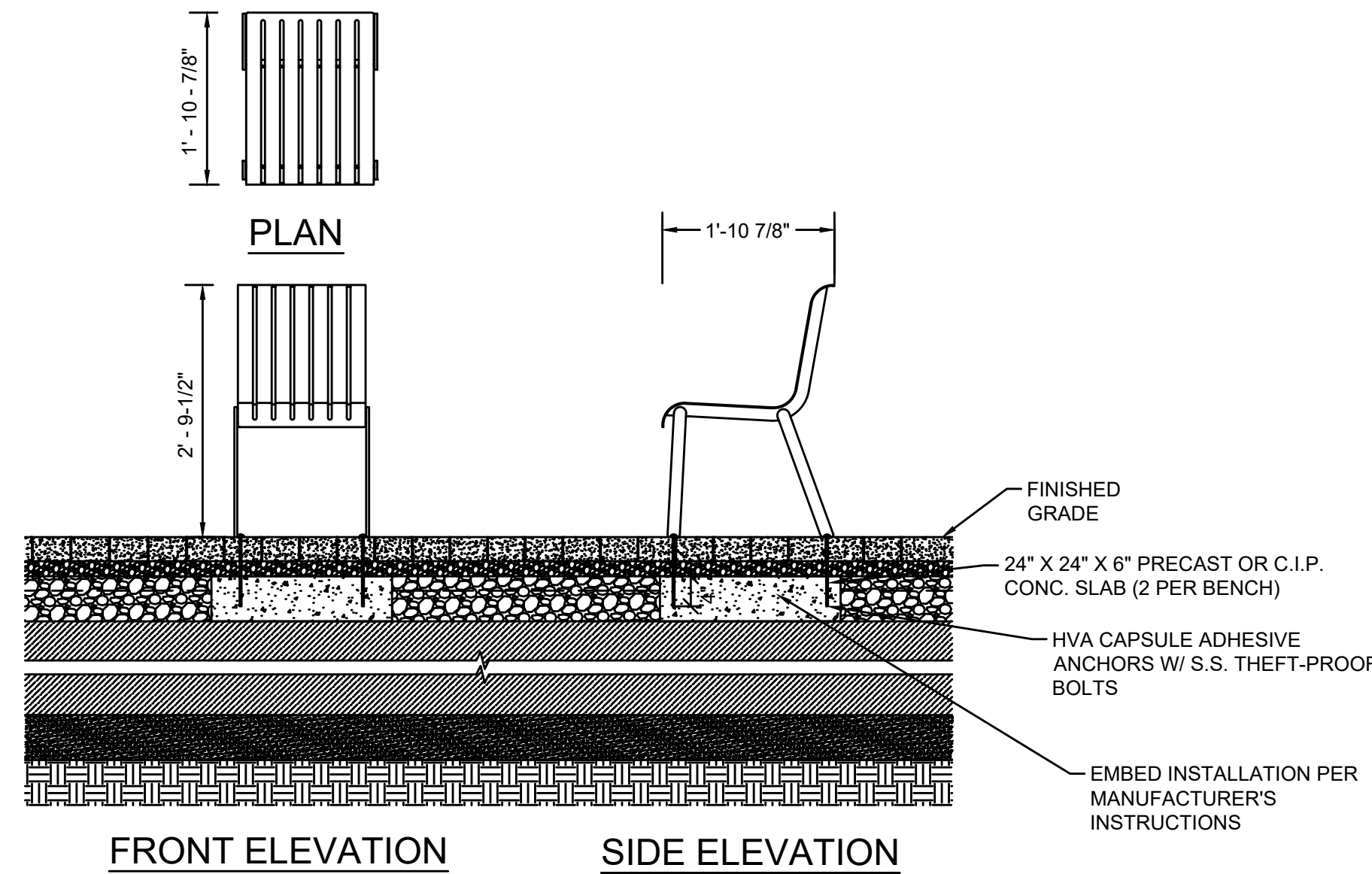


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MASSACHUSETTS

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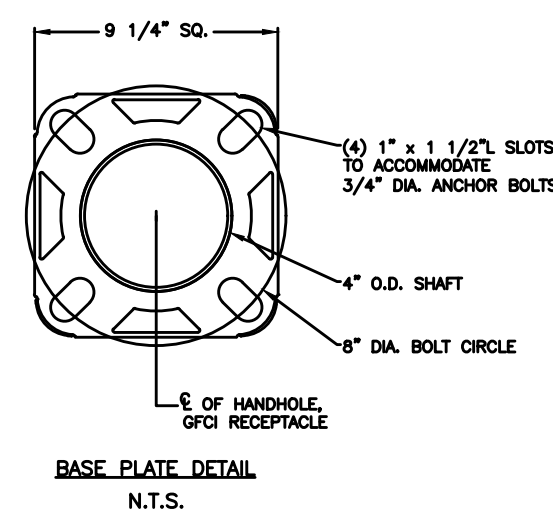


NOTE:
1. LOOSEN ROOTS AT THE OUTER EDGE OF ROOTBALL OF CONTAINER GROWN SHRUBS.

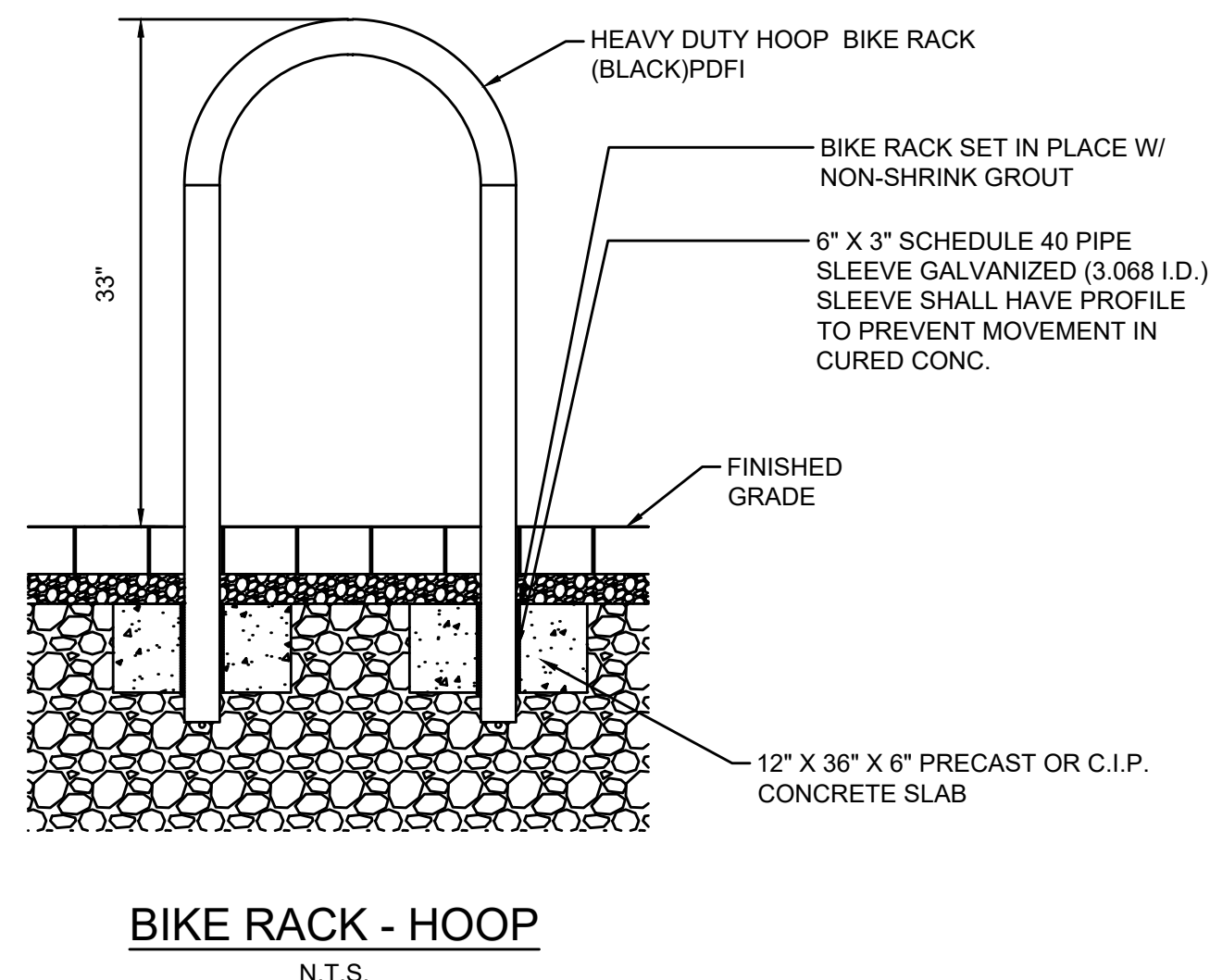
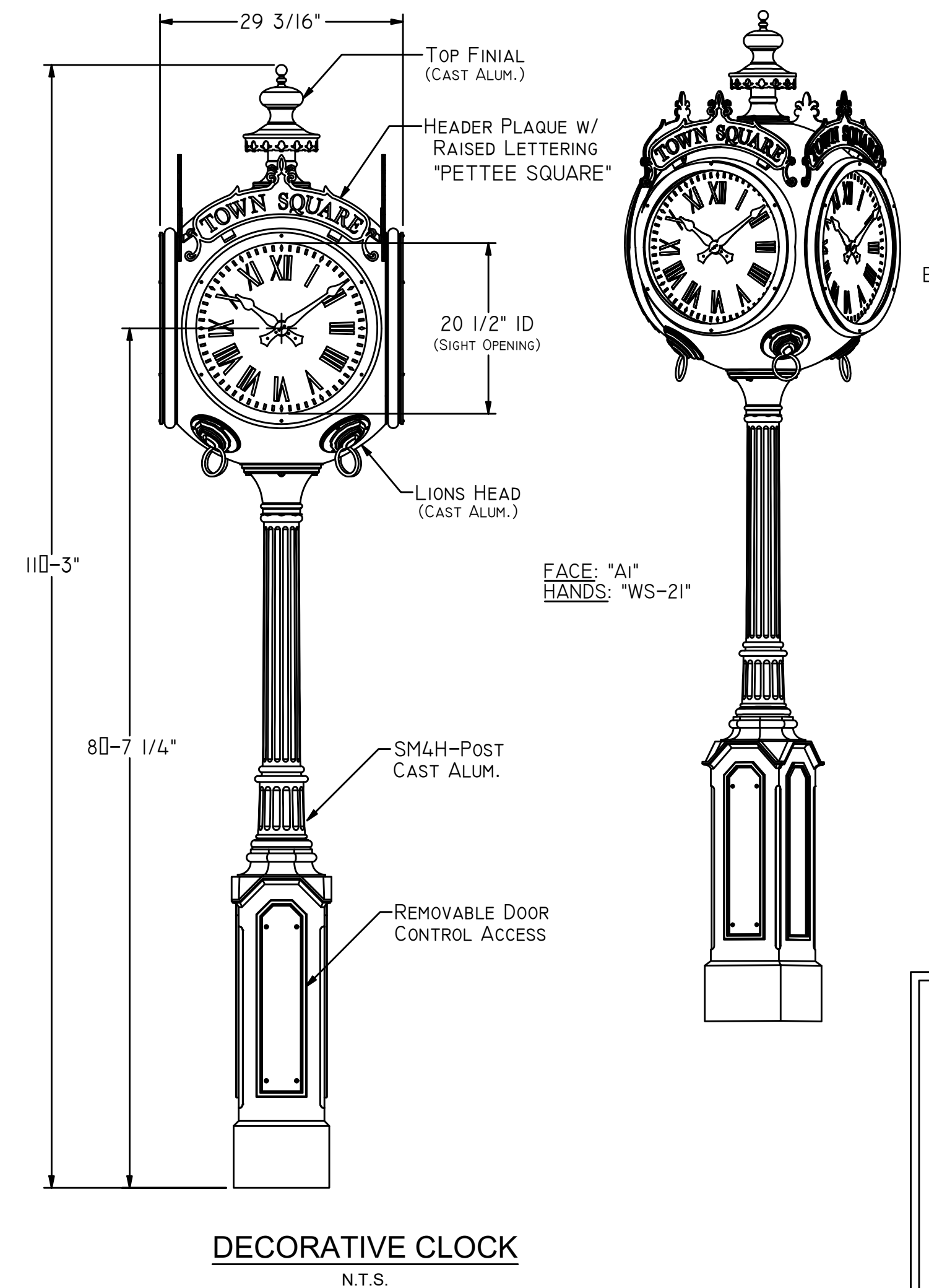


LUMINAIRE SPECIFICATIONS
MANUFACTURER: GHISAMESTIERI
STYLE: JUN SMALL
LED: LED
LED CODE: A1Y
ES CLASSIFICATION: TYPE II
WATTAGE: 17W
CURRENT: 700mA
VOLTAGE: 120-277V
CCT: 3000K
FINISH: GLOSS BLACK
OPTIONS: POLE-TOP (9F)
TONDA DIFFUSER
TENON ADAPTOR #08-EC102PF
CATALOG NO.: JUN S QF-A1Y-LED-700-2A-3000

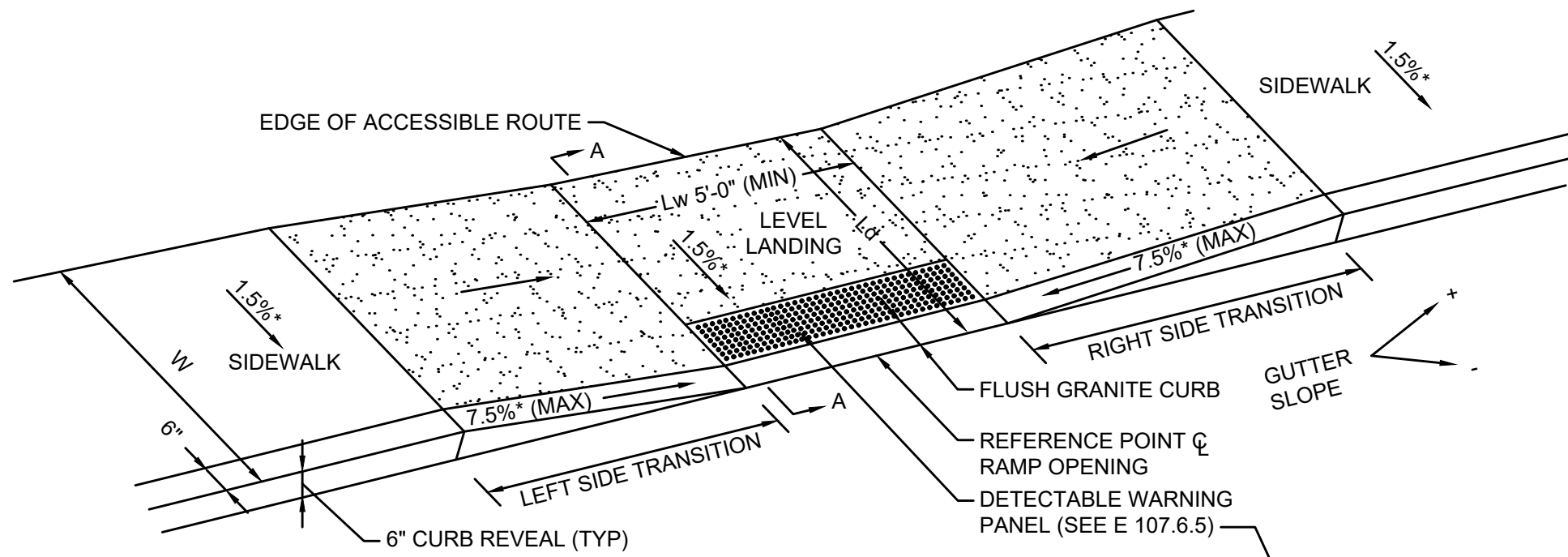
POLE SPECIFICATIONS
MANUFACTURER: PAK TUBULAR PRODUCTS
STYLE: ROUND NON-TAPERED ALUMINUM
HEIGHT: 12'-10"
BASE DIA: 4" DIA
TOP DIA: 4" DIA
MATERIAL: ALUMINUM, 156 WALL THICKNESS
FINISH: TIG POWDERCOAT - GLOSS BLACK
HANDHOLE: 3" x 5"
ANCHOR BOLTS: #3/4" x 17" + 3" HOOK
BOLT CIRCLE: #6
BOLT PROJECTION: 3 1/2"
TENON SIZE: 4" x 4"
OPTIONS: GFCI (LEVITON #QFWR2-E)
WEATHERPROOF WHILE-IN-U COVER (HUBBELL TAYMAC #MX42805-BLACK)
CATALOG NO.: RSMA1210CYE



BASE SPECIFICATIONS
MANUFACTURER: COMPOSITE MATERIAL TECHNOLOGIES (CMT)
STYLE: PHILADELPHIA SHROUD
HEIGHT: 3'-0"
BASE DIA: 16" DIA
MATERIAL: TWO-PIECE SPLIT SHROUD, ELASTOMERIC POLYURETHANE GLOSS BLACK
FINISH: GLOSS BLACK
CATALOG NO.: CDB-D21S-BLACK



CITY OF NEWTON
MASSACHUSETTS
LANDSCAPE & LIGHTING DETAILS
FOR THE
IMPROVEMENTS
AT
PETTEE SQUARE
OAK STREET AT CHESTNUT STREET



LEGEND:

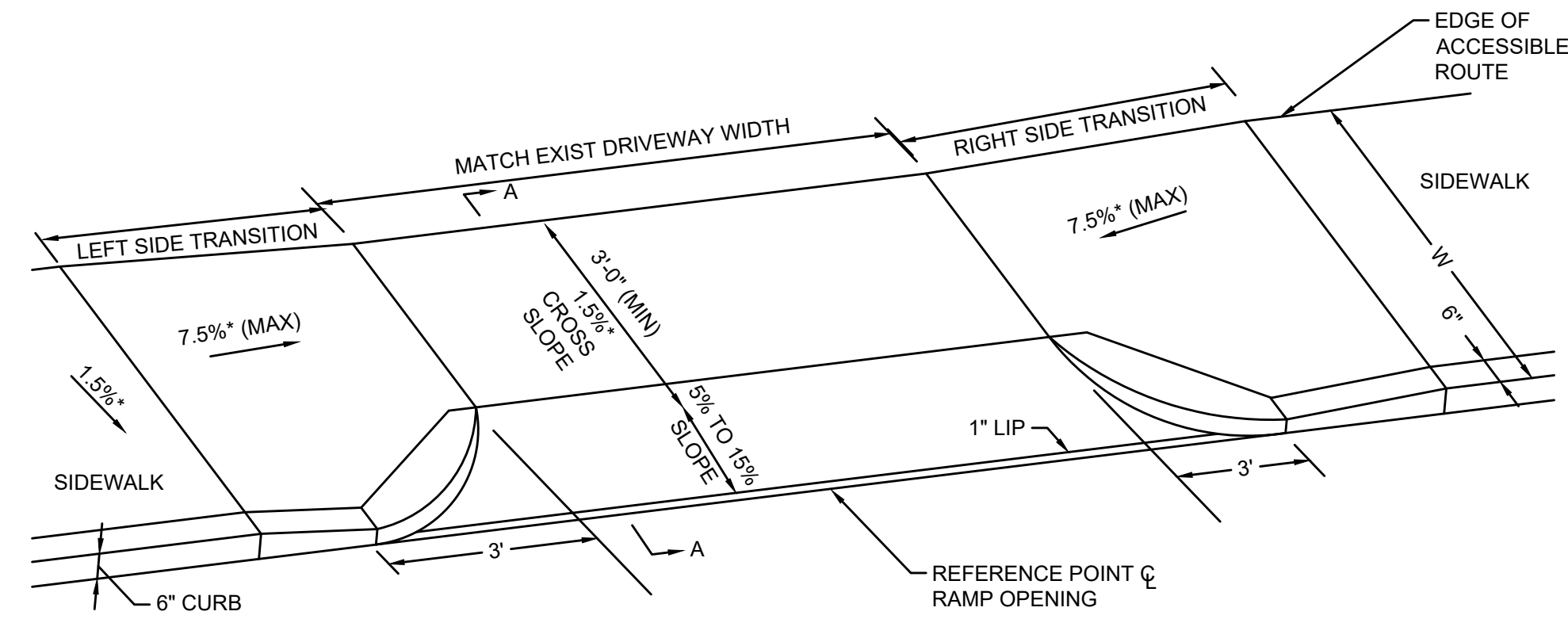
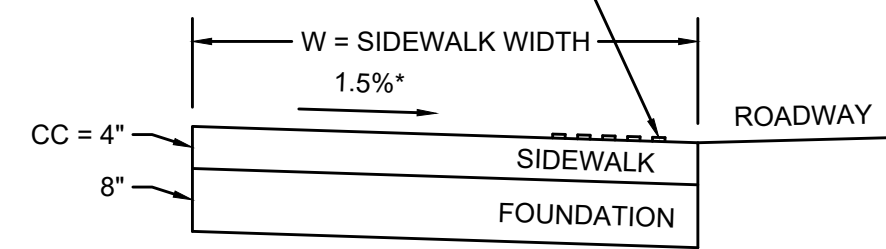
W = SIDEWALK WIDTH
CC = CEMENT CONCRETE
* = TOLERANCE FOR CONSTRUCTION ±0.5%

NOTES:

1. USABLE SIDEWALK WIDTH PER AAB = W-6"
2. USABLE SIDEWALK WIDTH PER AAB IS NOT TO BE LESS THAN 4'-0"
3. ROADWAY GUTTER SLOPE MEASURED FROM LEFT TO RIGHT WHEN FACING RAMP
4. SEE E 107.6.5 FOR DETECTABLE WARNING PANEL DETAILS
5. SEE E 107.2.1 FOR ALL OTHER DETAILS

WHEELCHAIR RAMP TYPE A

N.T.S.



LEGEND:

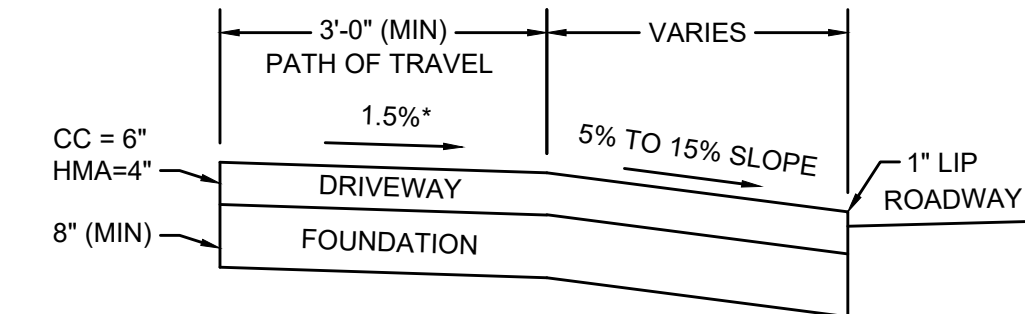
W = SIDEWALK WIDTH
Wc = CURB WIDTH
CC = CEMENT CONCRETE
HMA = HOT MIX ASPHALT
* = TOLERANCE FOR CONSTRUCTION ±0.5%

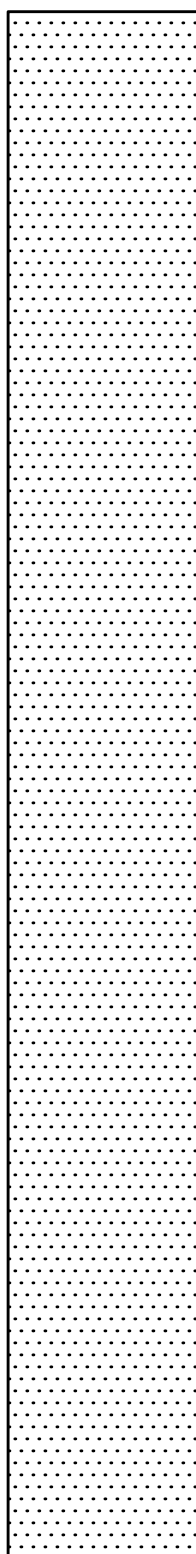
NOTES:

1. USABLE SIDEWALK WIDTH PER AAB = W-6"
2. USABLE SIDEWALK WIDTH PER AAB IS NOT TO BE LESS THAN 4'-0"
3. ROADWAY GUTTER SLOPE MEASURED IN UPSTATION DIRECTION
4. SURFACE TREATMENT VARIES; SEE PLANS

SIDEWALK THROUGH DRIVEWAY TYPE A

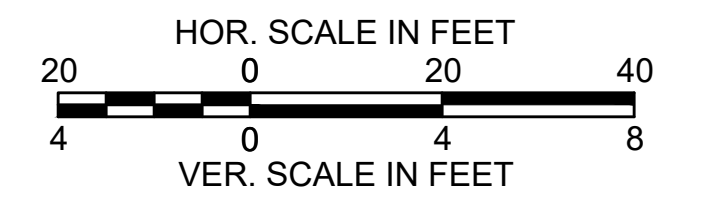
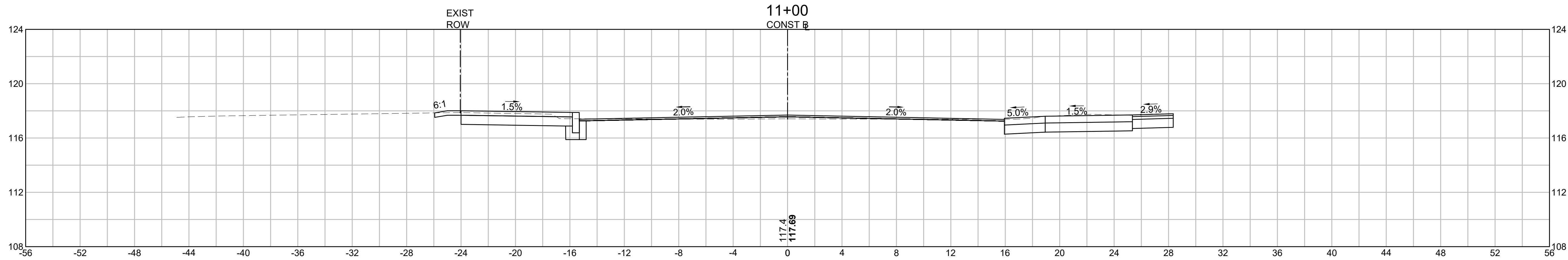
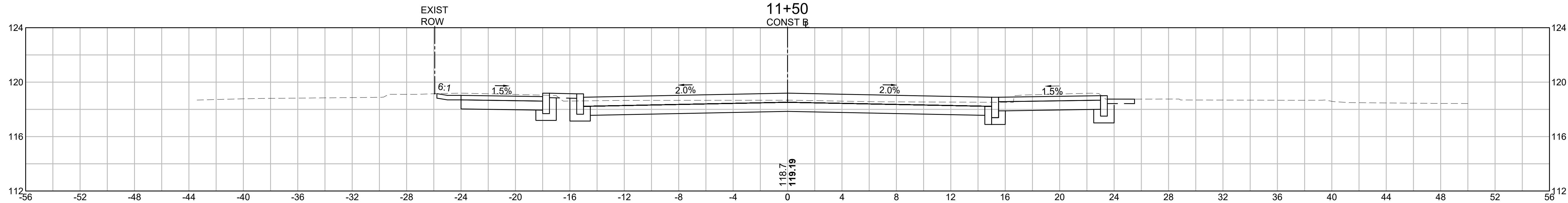
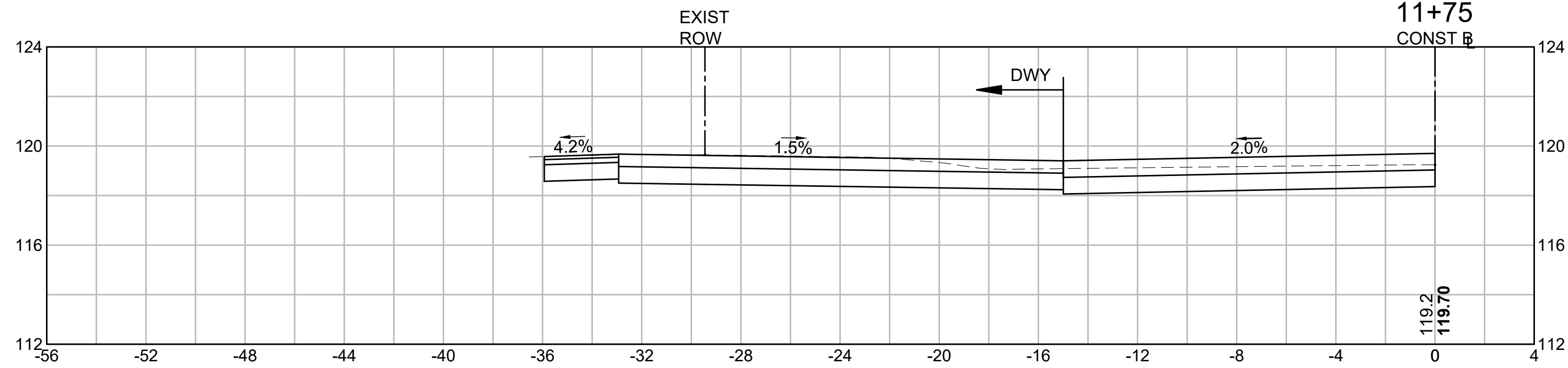
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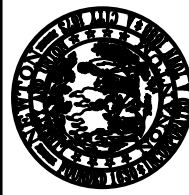


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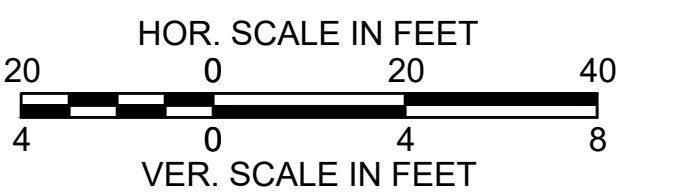
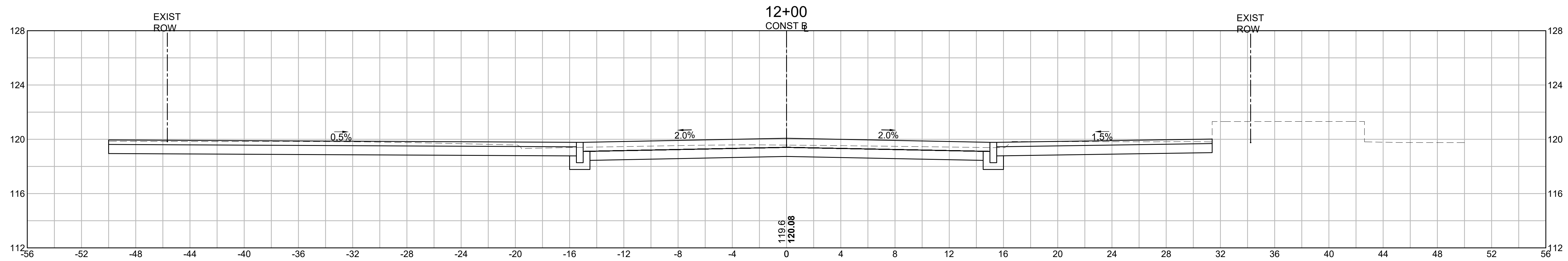
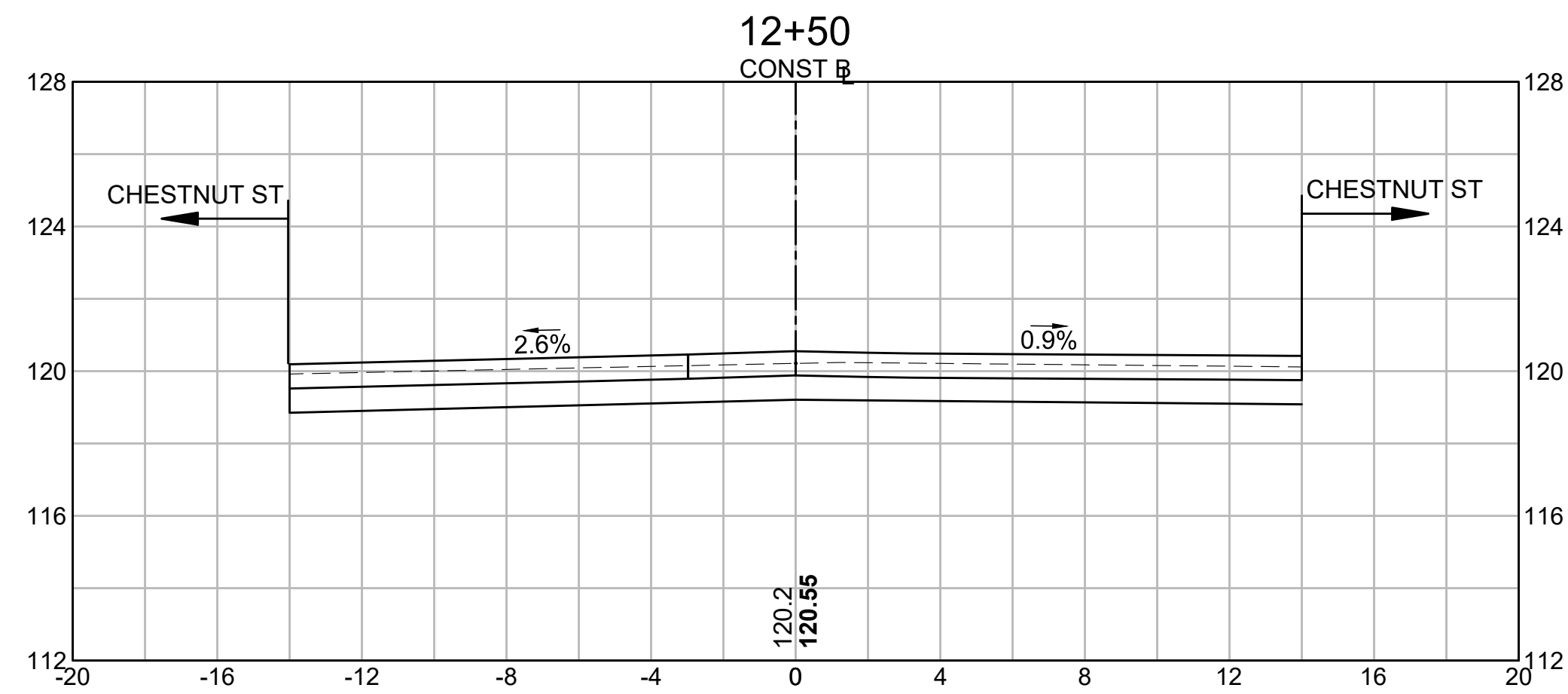
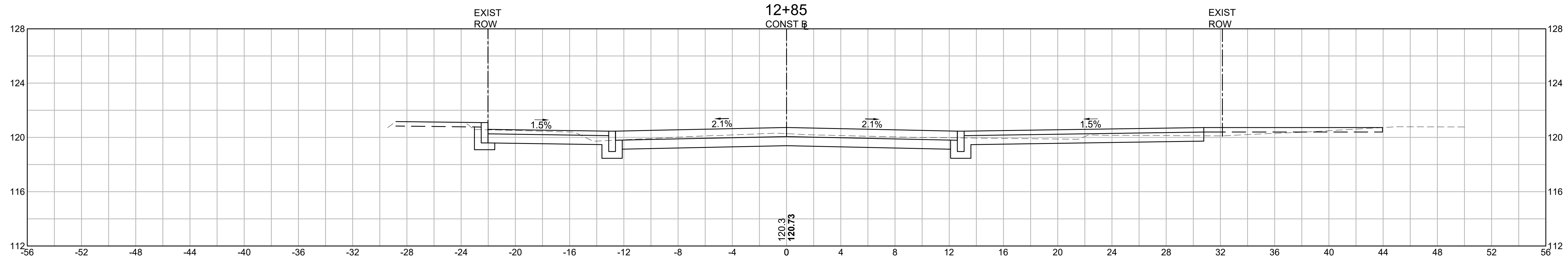


CITY OF NEWTON
MASSACHUSETTS
CROSS SECTIONS - 1 OF 9
FOR THE
IMPROVEMENTS
AT
PETTEE SQUARE
OAK STREET AT CHESTNUT STREET

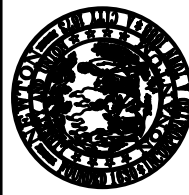


CITY OF NEWTON
MASSACHUSETTS

DESIGNED BY: RLC
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CHECKED BY: LSA
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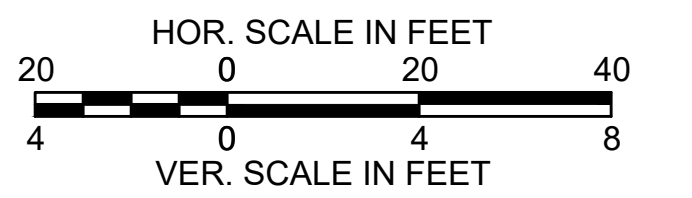
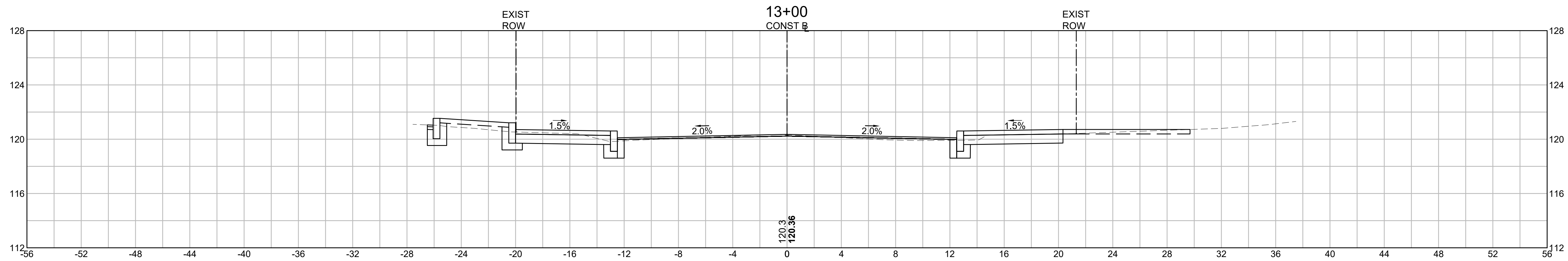
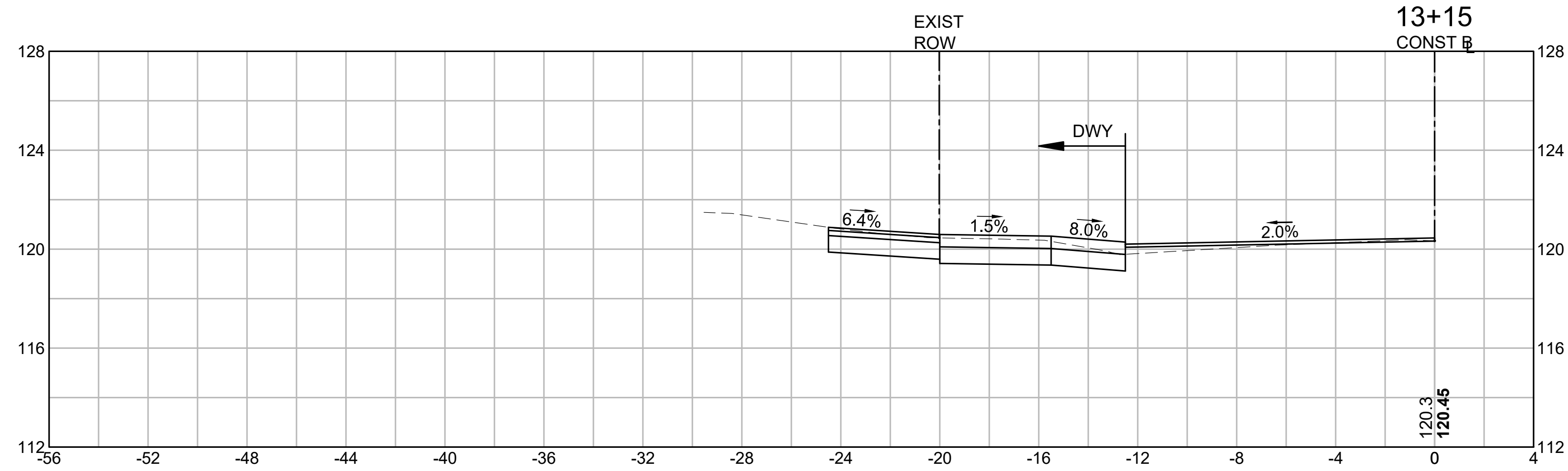
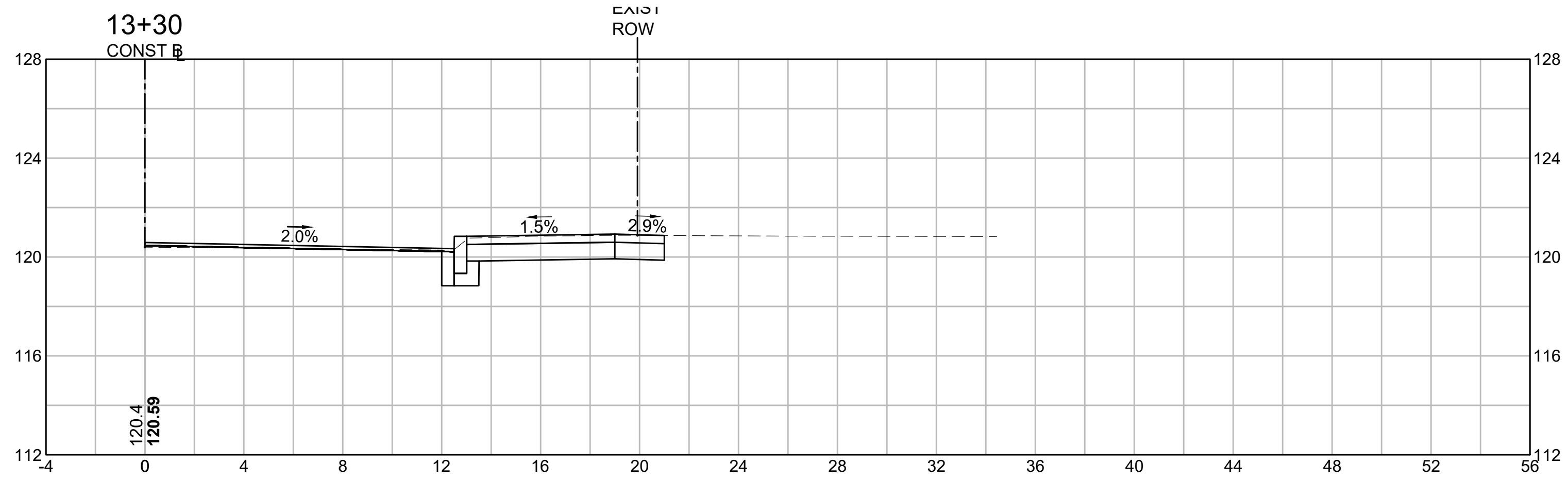


CITY OF NEWTON
MASSACHUSETTS
CROSS SECTIONS - 2 OF 9
FOR THE
IMPROVEMENTS
AT
PETTEE SQUARE
OAK STREET AT CHESTNUT STREET

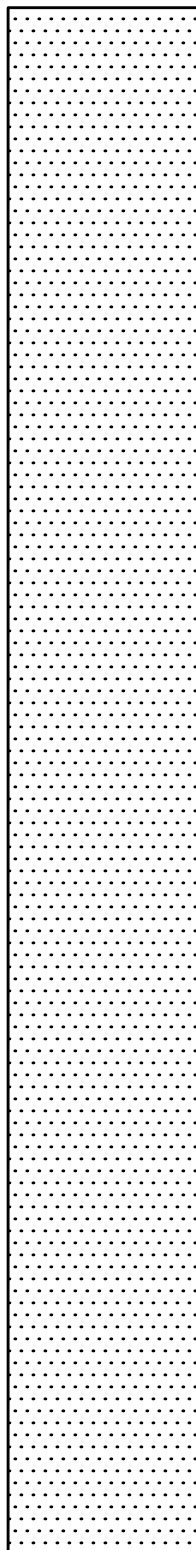


CITY OF NEWTON
MASSACHUSETTS

DESIGNED BY: RLC
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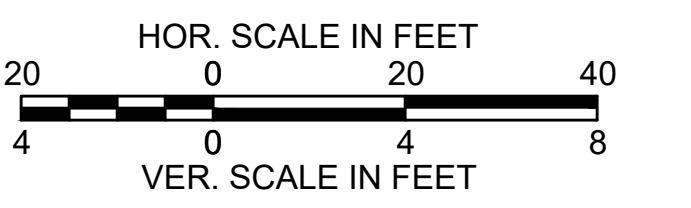
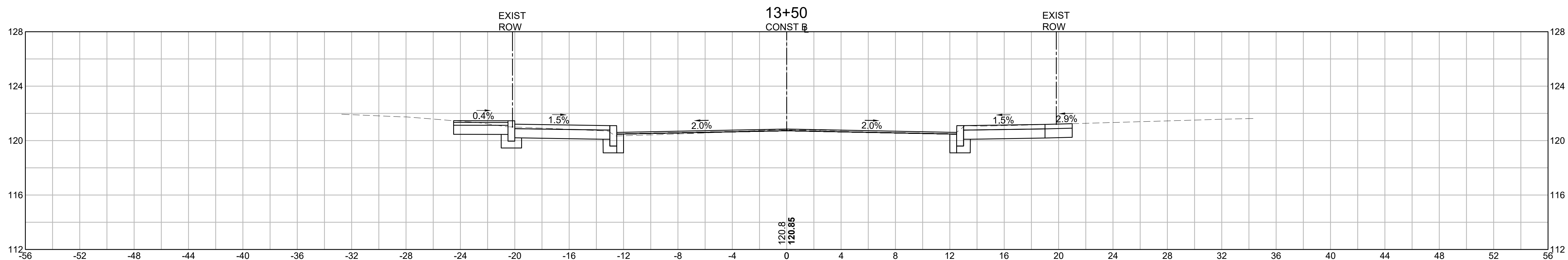
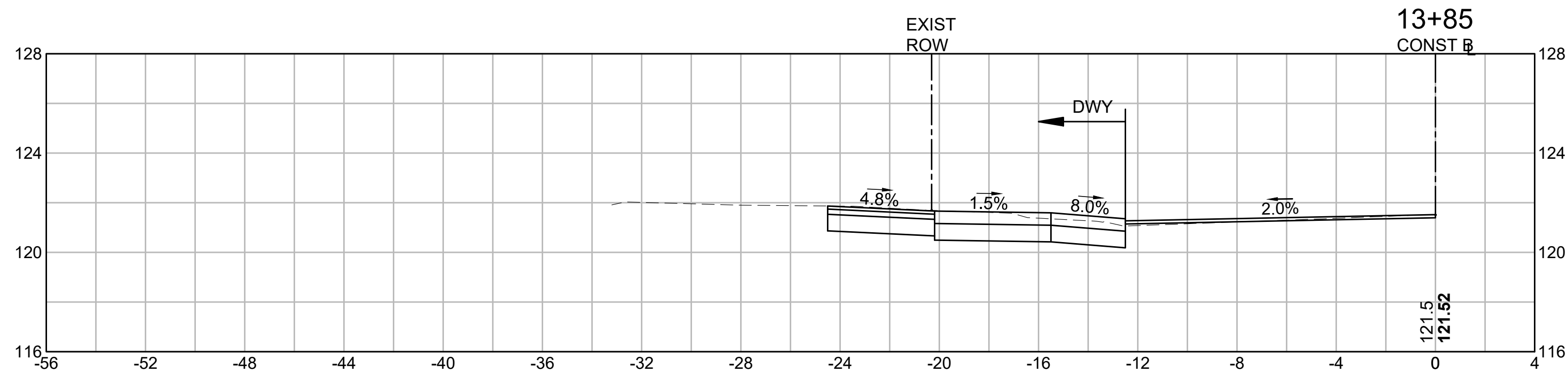
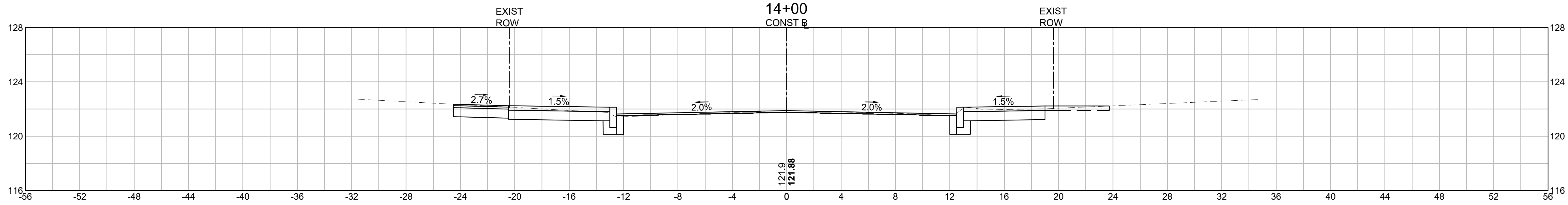


CITY OF NEWTON
MASSACHUSETTS
CROSS SECTIONS - 3 OF 9
FOR THE
IMPROVEMENTS
AT
PETTEE SQUARE
OAK STREET AT CHESTNUT STREET

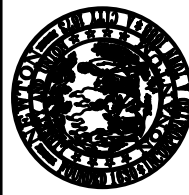


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MASSACHUSETTS

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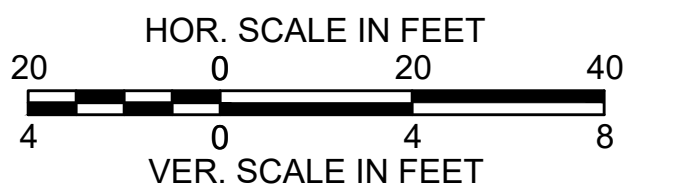
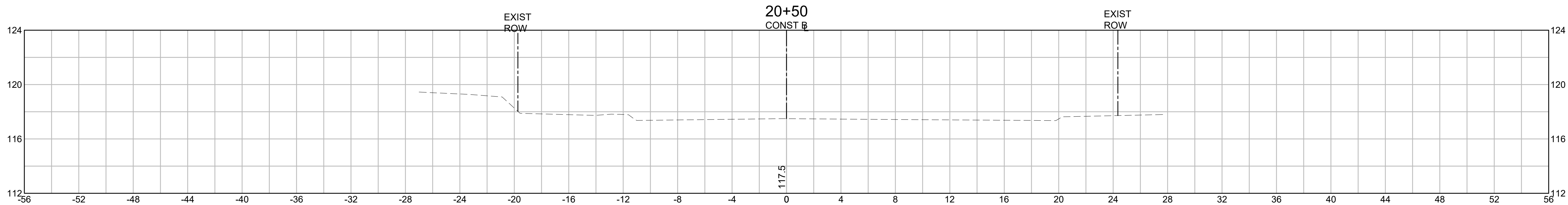
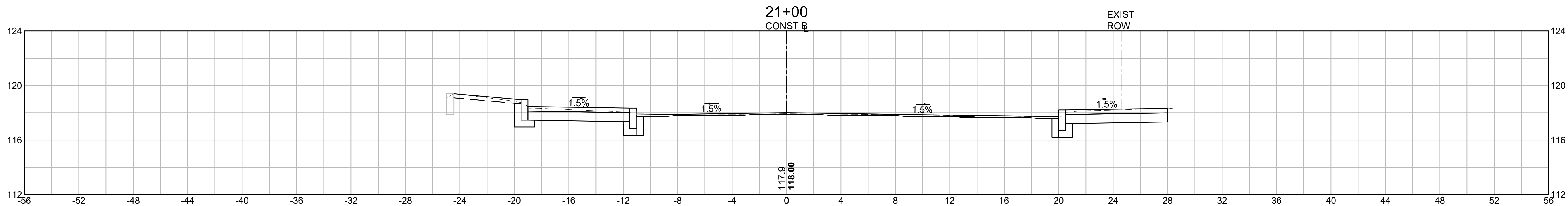
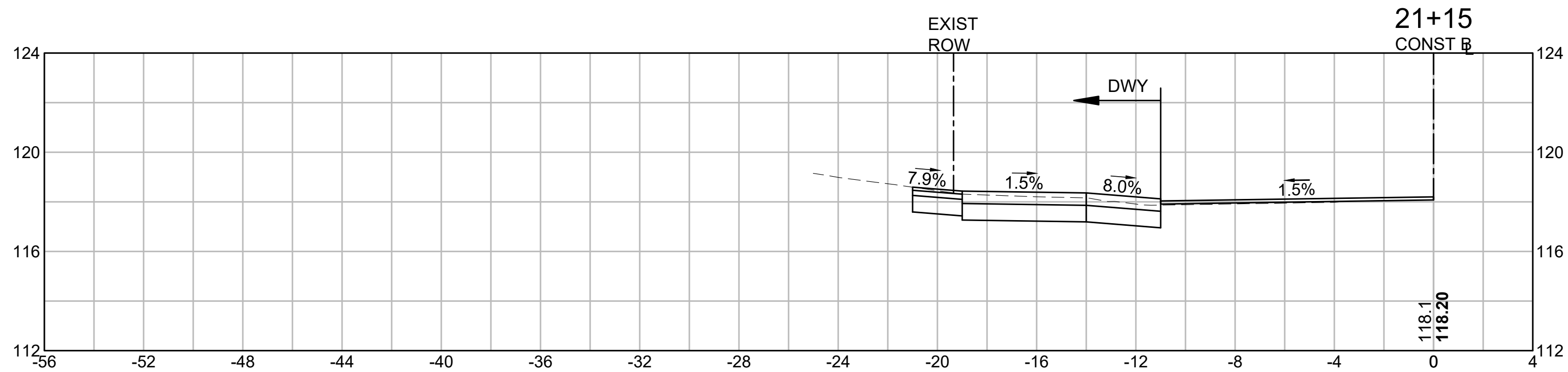
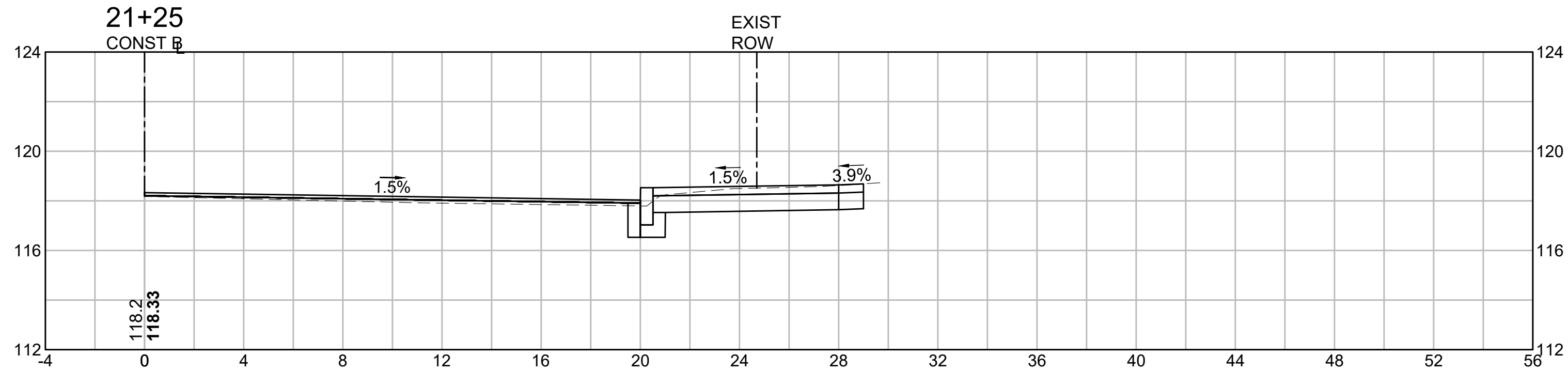


CITY OF NEWTON
MASSACHUSETTS
CROSS SECTIONS - 4 OF 9
FOR THE
IMPROVEMENTS
AT
PETTEE SQUARE
OAK STREET AT CHESTNUT STREET

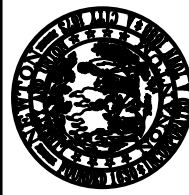


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MASSACHUSETTS

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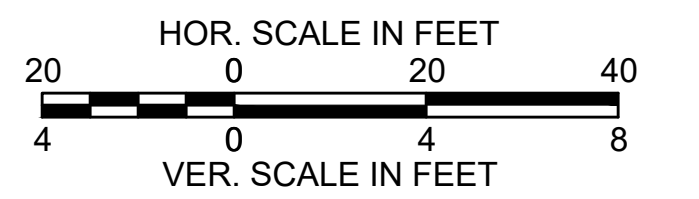
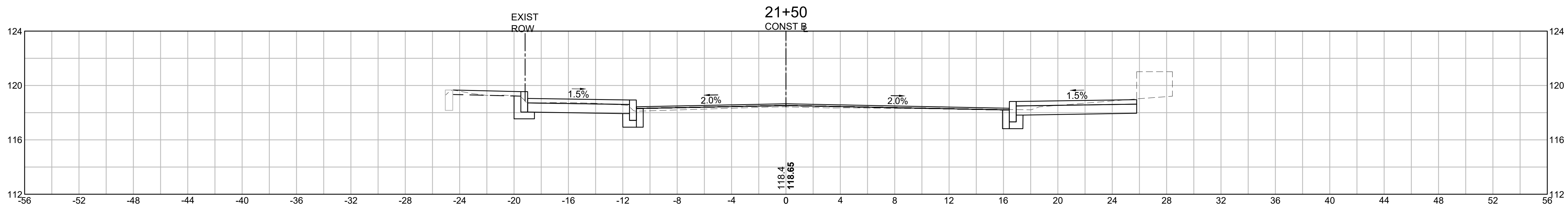
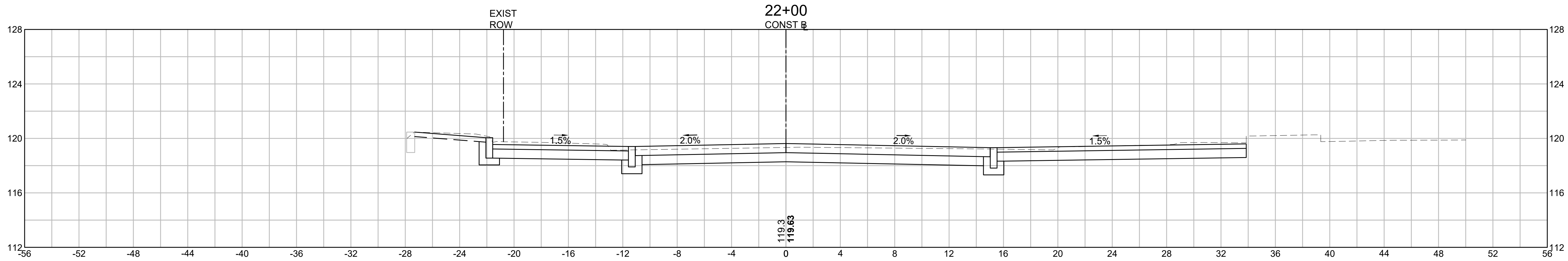
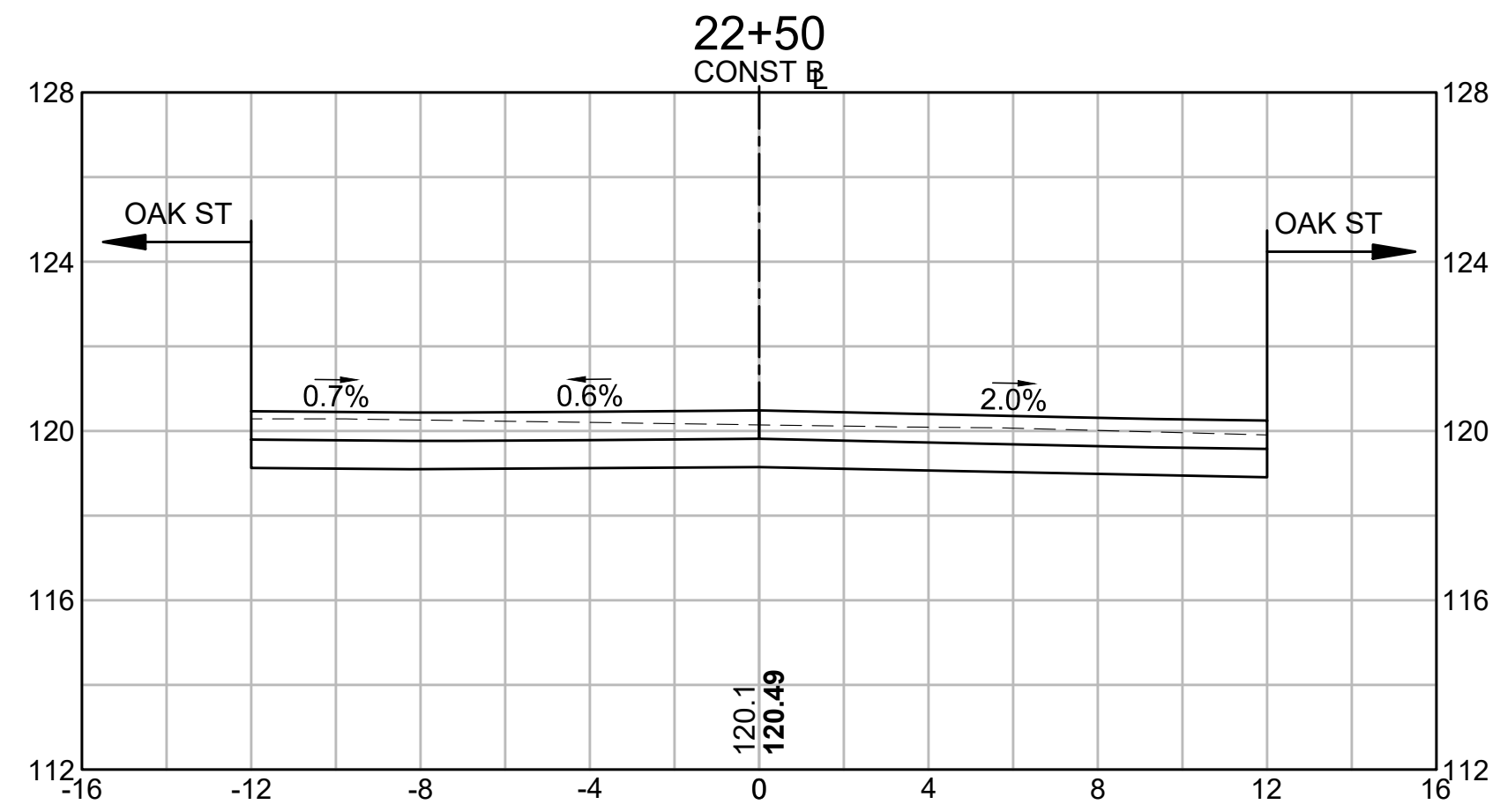


CITY OF NEWTON
MASSACHUSETTS
CROSS SECTIONS - 5 OF 9
FOR THE
IMPROVEMENTS
AT
PETTEE SQUARE
OAK STREET AT CHESTNUT STREET

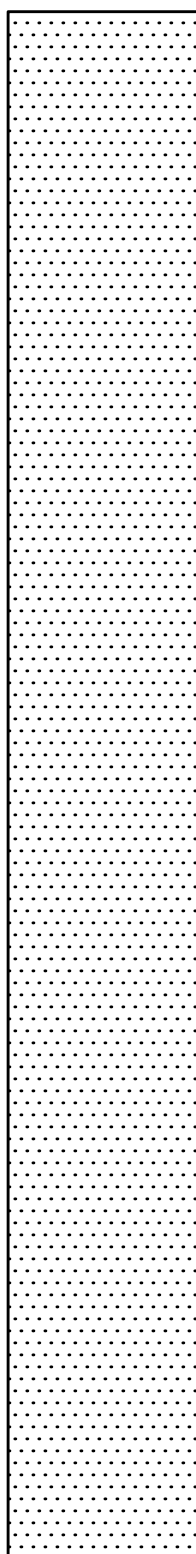


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MASSACHUSETTS

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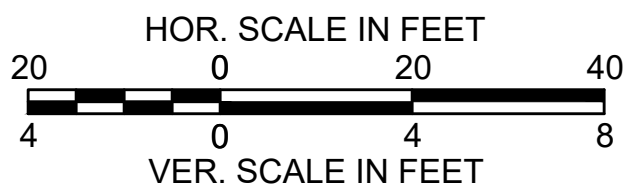
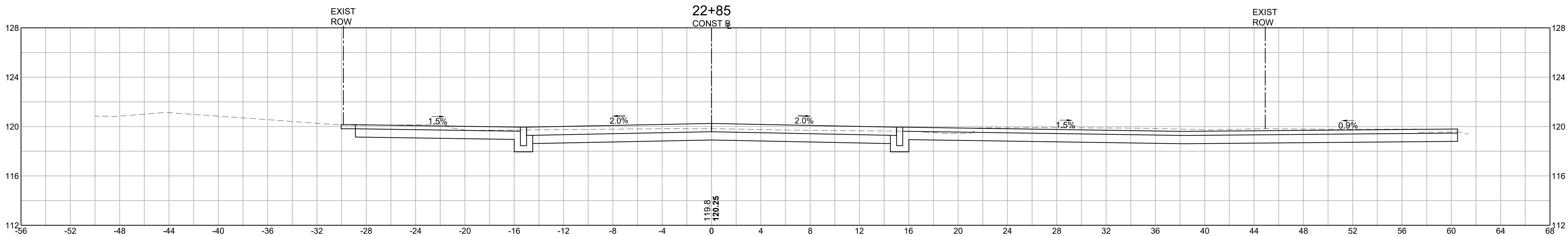
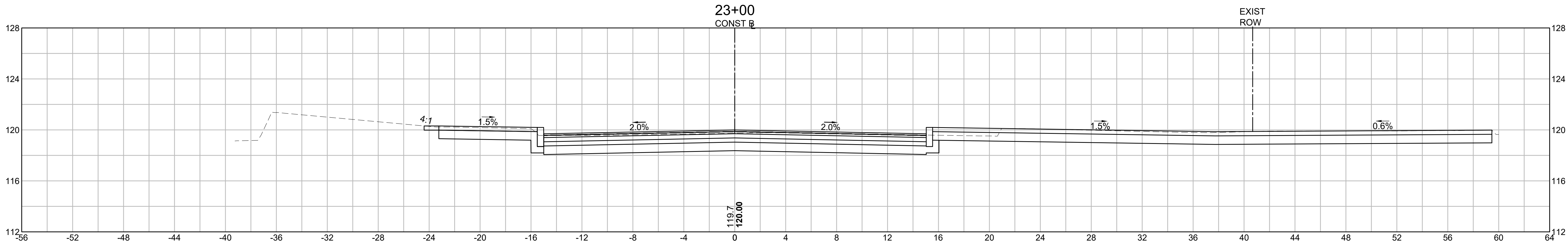
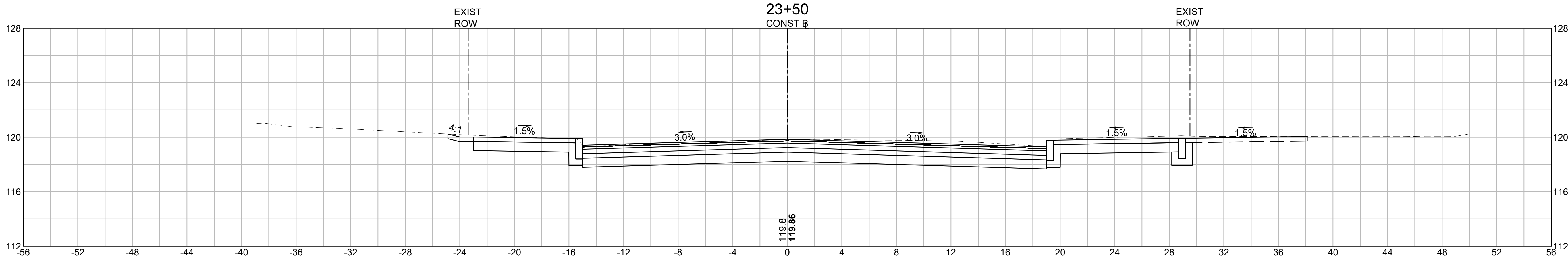


CITY OF NEWTON
MASSACHUSETTS
CROSS SECTIONS - 6 OF 9
FOR THE
IMPROVEMENTS
AT
PETTEE SQUARE
OAK STREET AT CHESTNUT STREET



CITY OF NEWTON
MASSACHUSETTS

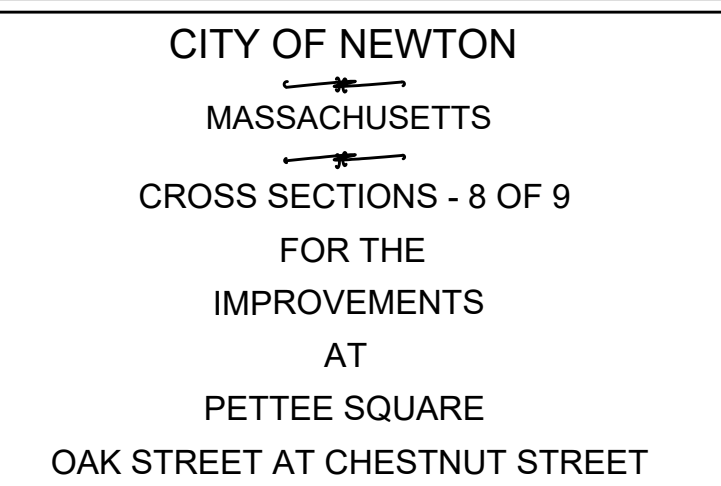
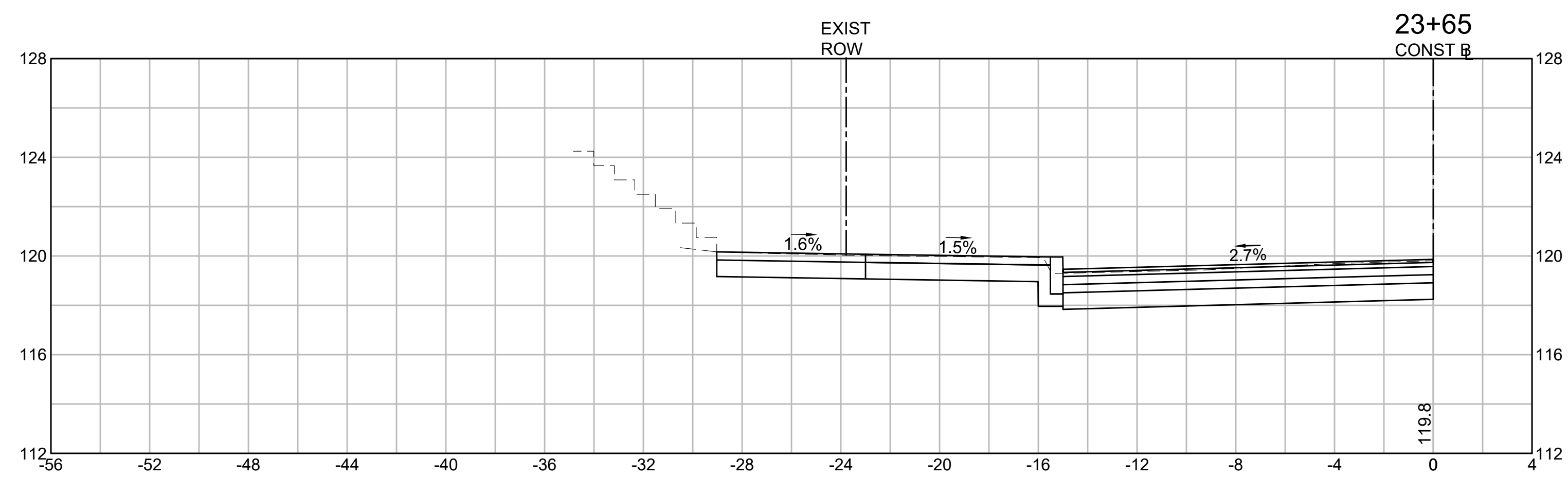
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CITY OF NEWTON
MASSACHUSETTS
CROSS SECTIONS - 7 OF 9
FOR THE
IMPROVEMENTS
AT
PETTEE SQUARE
OAK STREET AT CHESTNUT STREET




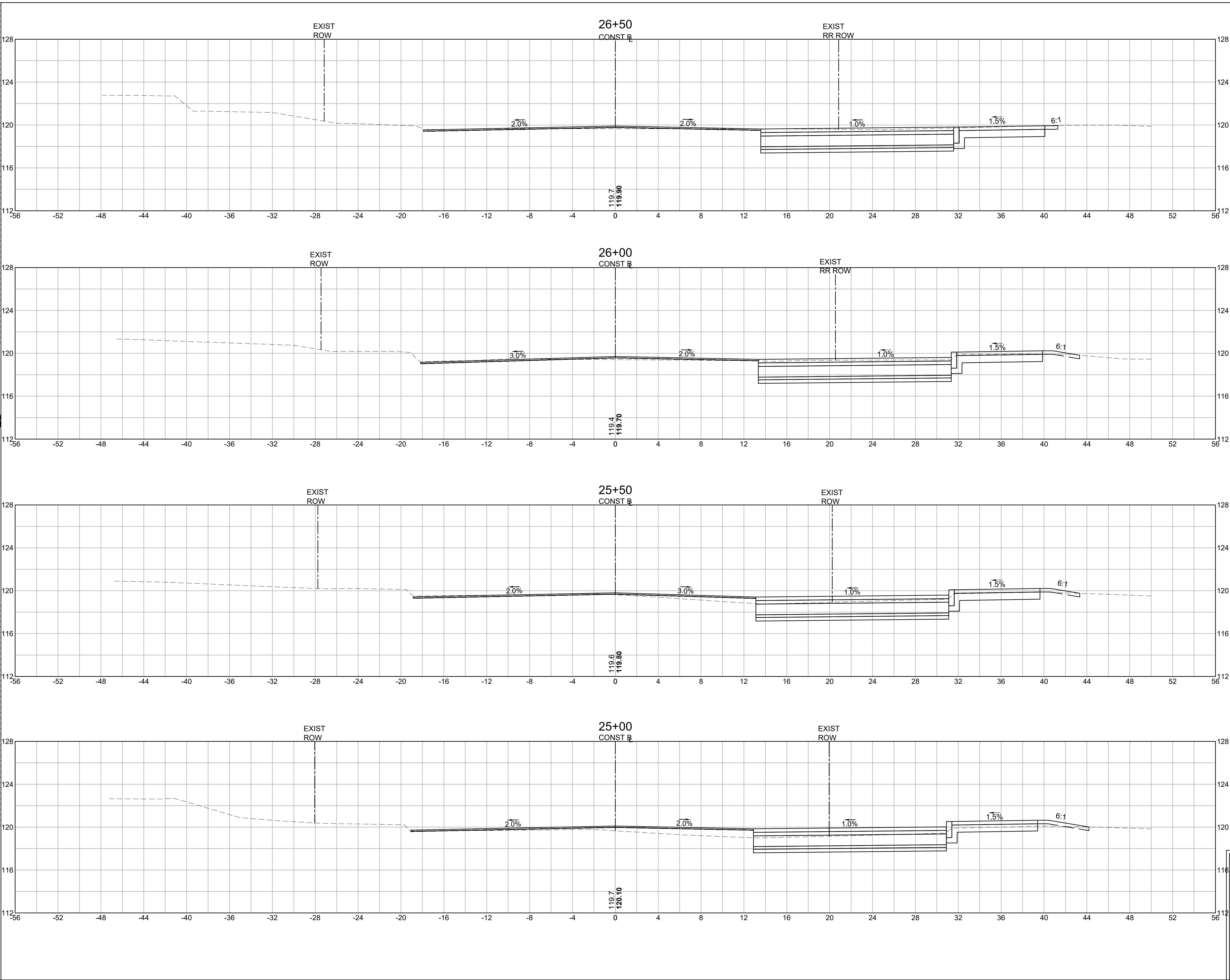
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CITY OF NEWTON
MASSACHUSETTS





20 0 20 40

4 0 4 8

HOR. SCALE IN FEET
VER. SCALE IN FEET

CITY OF NEWTON
MASSACHUSETTS

CROSS SECTIONS - 9 OF 9
FOR THE
IMPROVEMENTS
AT
PETTEE SQUARE
OAK STREET AT CHESTNUT STREET

SHEET 33 OF 33